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IRRATIONALITY AND POPULAR ARCHAEOLOGY

Kenneth L. Feder

An important aspect of archaeology is communicating the significance of data and research results to a fascinated, although often uninformed public. However, on the basis of book sales, newspaper coverage, television programming, and film presentations, it would seem that the public is inordinately fascinated by the more extreme, speculative, and often pseudoscientific claims made by those purporting to use archaeological data. Through questionnaires distributed to undergraduate students and to professional, teaching archaeologists, I made an attempt to comprehend the nature of the public's appetite for pseudoscientific archaeological claims. The role of education in refuting or perpetuating pseudoscience in archaeology was then assessed.

PSEUDOSCIENCE AND ARCHAEOLOGY

Archaeology is a science that clearly attracts a great deal of public interest. Our field exists, at least in part, because non-archaeologists are fascinated by the past. They take our courses, attend our lectures, buy our books, and visit our museums and archaeological monuments. This public interest, in a very real sense, helps support the research that archaeologists perform (King 1981). Therefore, I believe that professionals are obligated to pay more than lip service to the importance of an archaeologically well-informed public. An important aspect of archaeology thus rests in communicating the significance of the data and research results to a fascinated, although often uninformed and credulous, public.

As professionals we must all be concerned with the uncritical and often non-rational treatment our field receives in the popular media. It is to our advantage to have an archaeologically well-informed public, and to our great disadvantage to have that public harbor gross misconceptions about the past and its study. Many of us have teaching as one of our main duties, and we should at the very least be able to produce students who can differentiate the rational from the irrational in archaeology. There are two important questions that professional archaeologists should address: 1) why are people attracted to speculative claims related to the human past that appear in popular media, and 2) how should professional archaeologists respond to the irrational use of archaeological topics?

A number of studies have been conducted concerning public acceptance of various questionable ideas or claims. In 1930 the Institute of School Experimentation at Teachers College, Columbia University, conducted a survey among high school students at ten schools located in different parts of the United States. The study was designed to determine the extent to which popular, although perhaps unfounded and erroneous beliefs were held by these students. One of the goals of the study was to determine whether or not educational institutions were effectively addressing such beliefs. A secondary question concerned whether or not these institutions had a positive impact in terms of increasing the level of critical thinking among their students. The results of this research were summarized in a single sentence; "The returns from the inquiry show that agencies, including education, which influence people, have not prevented or removed belief in signs and superstitions among students" (Lundeen and Caldwell 1930:272).

In a study conducted more recently, college students were questioned concerning a variety of topics related to the so-called occult and paranormal (Bainbridge 1978). Included were the topics of biorhythms, astrology, extra-sensory perception, UFOs, and the claims of the Swiss author Erich von Däniken (1970, 1972, 1974) that human physical and cultural evolution was directed by extra-

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terrestrial aliens. Based on an analysis of student responses, Bainbridge was forced to conclude in reference to the last of these topics that, "Students who were seniors and about to graduate from college were no more likely than freshmen students to reject the theory" (1978:37).

Bainbridge suggests further that, "Apparently our university does not give students the knowledge to protect them from intellectual fraud"; this "may simply reflect a failure of higher education" (1978:39).

Whether we agree that it is specific knowledge or, instead, the intellectual tools of scientific reasoning that are most important to impart to our students, Bainbridge's conclusion is indeed disconcerting. However, perhaps we should not be surprised, given our culture's fascination with the irrational and the occult. A number of television programs regularly present extremely questionable and, at best, unverified claims as fact. Supermarket tabloids announce miraculous cures for cancer, an imminent invasion from outer space, the discovery of living sauropods, and the excavation of flying saucers from beneath Egyptian pyramids. Bookstore stalls are filled with pseudoscientific works that purport to "prove" all sorts of nonsense. Newspapers print regular astrology columns.

Archaeology and prehistory have been major targets of the purveyors of pseudoscience and superstition. In fact, as many of us are painfully aware, our field has always attracted a tremendous amount of completely unsupportable speculation by what must be explicitly labeled a pseudoscientific fringe. Members of this fringe seem bent on proving, through the misuse of archaeological evidence, all sorts of untenable racist theories, particular religious ideologies, and various esoteric views of reality. Some, of course, are for the most part content simply to make money. Wauchope (1962) and Cazeau and Scott (1979) provide two excellent overviews of the situation.

One of Bainbridge's conclusions seems quite important in its implications for archaeologists who teach. His survey was done among 235 college students in introductory sociology courses at the University of Washington at Seattle. Focusing on the hypothesis of prehistoric extraterrestrial control of or involvement in human physical and cultural evolution, Bainbridge (1978:35) found that 28% of his student sample professed belief in ideas like von Däniken's. It was further determined that, in terms of student belief in such ideas, "It did not matter whether students had taken courses in astronomy, anthropology, ancient history, social science or physical science" (Bainbridge 1978:39).

In the statistical tests applied, it was shown that students who had taken a course in anthropology or archaeology were no more likely than those who had not, to reject the claim of von Däniken that the archaeological record is replete with evidence of extra-terrestrial involvement in the human past.

Attempting to explain this result, Bainbridge went on to suggest, "Of course it is rare for a college professor to mention von Däniken. Teachers of anthropology and ancient history never bother to refute the theory that human culture was received from ancient astronauts" (1978:39).

The statistic of 28% acceptance of ancient astronauts seems not so bothersome as the determination that this figure did not change when students who had taken no archaeology courses were compared with those who had. If it is true, as Bainbridge maintained, that this is because archaeologists (or anthropologists or historians) simply ignore ancient astronauts (and similarly ignore scientific creationism, Atlantis, and other popularly held pseudoscientific beliefs), then clearly our profession does a disservice to its students. We neglect to provide them with the requisite knowledge and intellectual tools to deal with the kinds of nonsense that surround our field and with which they are inundated by the popular media. Forget, at least for a moment, the dedicated "ancient astronauts," the committed "Atlantisologists" and so on—perhaps they are indeed unreachable. They probably will make up a very small percentage of any college population. On the other hand, if one-third or even one-tenth of our students can leave an introductory course in archaeology or world prehistory without seeing that von Däniken represents the worst variety of pseudoscience, then we are simply not doing our jobs regardless of whether or not these same students can remember the half-life of the C-14 isotope or the age of the Indus Valley civilization.

With the Bainbridge research in mind I initiated the study described here. Two questionnaire surveys were conducted. The first was meant to assess the level and correlates of student belief in and acceptance of a number of extreme and pseudoscientific claims made in the name of archaeology or prehistory and appearing in popular media. The second survey was designed to determine the

level of response to or coverage of these claims by professional teaching archaeologists in their classrooms.

The claims included in this research are: a) ancient astronauts (von Däniken 1970, 1972, 1974), b) scientific creationism (Gish 1973; Morris 1974), c) hyper-diffusionism, particularly as represented by the work of Barry Fell (1976, 1980), d) the Lost Continent of Atlantis (Berlitz 1969; Donnelly 1971), e) Bigfoot (Guenette and Guenette 1975), f) the existence of Noah's Ark (LaHaye and Morris 1976), g) the curse of "King Tut," h) psychic archaeology (Goodman 1977; Schwartz 1978; Jones 1979), i) dowsing in archaeology (Hume 1974), j) the Loch Ness Monster (Snyder 1977), k) the hypothesis of New World evolution as espoused by Jeffrey Goodman (1982), and l) the claimed existence of dinosaur and human footprints in the same geological strata (Morris 1980).

The first survey involved distributing 200 five-page questionnaires to students on the first day of their spring 1983 classes in introductory anthropology, archaeology, sociology, and biology at Central Connecticut State University (CCSU). Since the majority of these students were in these classes simply to fulfill general education requirements, I believed that they would constitute a fairly representative sample of our student population. The 186 valid returns represent the data base for this phase of the analysis.

The second survey was mailed out with postage paid return envelopes to 610 professional teaching archaeologists. The 1983 AAA Guide to Departments of Anthropology was examined and survey forms were sent to individuals listing archaeology or prehistory as major research and teaching interests.

THE STUDENT QUESTIONNAIRE

The questionnaire distributed to the CCSU students was designed on a common psychology test model (see Appendix 1). A series of demographic questions including age, sex, year in college, and religious affiliation was asked. Students were also asked their grade point average, their major, where they get most of their world news, the number of books they read on a yearly basis, their parents' educational background, and their political leanings. In each case the students were provided with bounded answers in a multiple choice format so as to standardize responses for ease of statistical analysis.

Students were then presented with a set of fifty statements to rate on the following scale: 1 = Strongly believe, 2 = Mildly believe, 3 = Don't know, 4 = Mildly disbelieve, 5 = Strongly disbelieve.

Questions were designed to elicit from the students their opinions on a wide variety of topics relevant to their attitudes about many different scientific as well as popular and pseudoscientific claims appearing in electronic and print media. Some of these statements relate directly to archaeology; most do not but were presented in the search for possible correlation and causality.

The Student Sample

Central Connecticut State University is the sixth oldest public institution of higher learning in the United States. Our enrollment of some 6,500 full-time and about 6,000 part-time attendees, provides a fairly representative sample of the student population of Connecticut. Most students come from a middle-or working-class background and many are the first generation in their families to attend college.

The constituency of CCSU is probably quite similar in many respects to any large, four-year public institution in the United States. The exception to this is in terms of religious background. Connecticut is a very strongly Roman Catholic state, and the student body reflects this quite clearly. However, in matters other than religion, I would maintain that the attitudes and opinions of our students are quite representative of those in similar institutions in the United States. As we shall see, this assumption appears to be valid.

In terms of age, 57% of the sample was younger than 20 years, 35% was between 20 and 25, and 8% was over 25. Fifty-two percent were freshmen, 25% sophomores, 11% juniors and 11% seniors. Their majors reflect the great changes that have occurred in higher education in the last ten years or so; only 7% were majoring in the physical sciences, 13% in the social sciences (many focusing in applied fields like social work), and 4% in the humanities. Thirteen percent were computer majors,

Table 1. Previous Coursework.

| | | | |
|-------------------------|------|-------------------|-------|
| Course in archaeology | 9.1% | Course in logic | 21.0% |
| Course in history | 95.2 | Course in geology | 30.1 |
| Course in psychology | 57.0 | Course in biology | 85.5 |
| Course in Bible studies | 23.1 | Course in science | 90.3 |
| Course in astronomy | 19.4 | | |

38% were majors in business, and the other 24% were in assorted applied fields such as industrial technology or engineering.

In our sample, 63% classified themselves as Catholic, 18% as Protestant, and 4% Jewish. Significantly, especially when considering anti-evolution sentiment, only 1% of our sample identified themselves as being "born-again" Christians. It should also be pointed out that just over one-third of the sample are weekly church-goers and over half attend religious services at least ten times a year.

Beyond this, 60% of the sample classified themselves as politically moderate, by far their favorite type of television program is the situation comedy, and they are not exactly what you could call avid readers: 12% read no books, 34% read one or two, 39% three to ten, and only 14% read more than ten books per year outside of assigned classroom reading.

Basically, the students in the sample, like the students at CCSU and, I would maintain, like most college students in the U.S. in the 1980s, are politically moderate, go to church with some degree of regularity, and go to college to "learn a trade." They are certainly not intellectuals, nor do they aspire to be. They take courses outside their practically oriented majors, not because they lust for knowledge, but because we force them to—at Central through a General Education program and through similar programs elsewhere. However, it is also clear that among those courses they would not take unless otherwise forced to, archaeology is fairly popular. While they object rather strenuously to "extraneous" academic work that distracts them from their narrowly oriented career-goals, they are nevertheless interested in our field.

One more background data set that should be examined involves academic experience in science. Most students in the sample had taken science courses and therefore had some exposure to a variety of scientific disciplines (see Table 1). One might expect from these statistics that the majority of the students had at least been introduced to the scientific method and were aware, in a general way, of how science works. One might further expect, or at least hope, that they would apply the general scientific principles they learned in biology or geology or whatever to archaeological questions.

Student Responses

In the 50 opinion questions, there were 10 that related to archaeological/paleontological topics:

1. The Loch Ness Monster really exists.
2. "Bigfoot" is a real animal roaming the woods in the American Northwest.
3. Aliens from other worlds visited the earth in the prehistoric past.
4. There is good evidence for the existence of the lost continent of Atlantis.
5. Human beings came about through evolution.
6. An ancient curse placed on the tomb of the Egyptian pharaoh "King Tut" actually killed people.
7. America was discovered by Europeans many years before Columbus.
8. The "Abominable Snowman" is a real creature living in Tibet.
9. The world is five billion years old.
10. Human beings biologically just like us have been around for about 40,000 years.

The results for four statements (3, 4, 6, and 7 above) labeled "Cult Archaeology" after Cole (1980) are presented in Figure 1. One can recognize a very clear pattern not unlike the Bainbridge results. The percentages of believers in von Däniken's ancient astronauts and in the existence of the lost continent of Atlantis are similar to Bainbridge's figure for acceptance of von Däniken. On the other hand, only 12% accepted the authenticity of the dread effects of the alleged curse on the tomb of

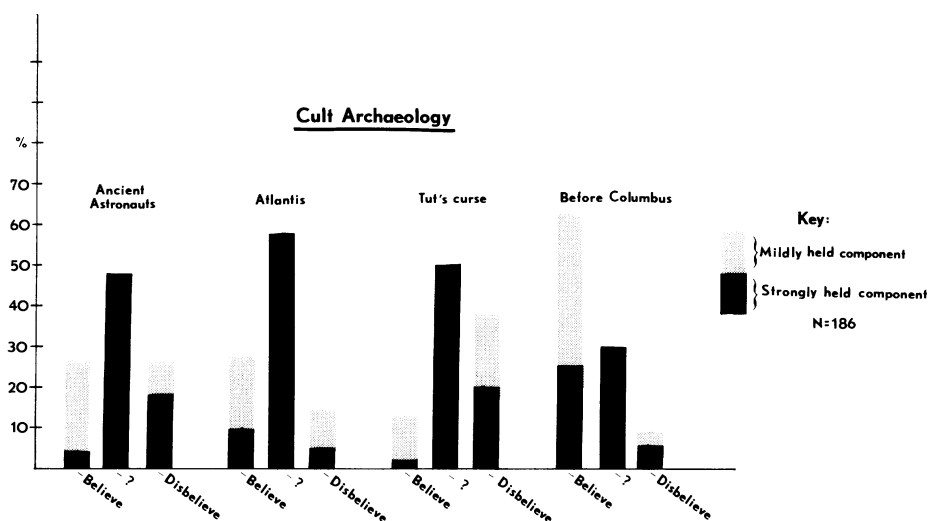


Figure 1. Student belief levels concerning a number of extreme claims about the human past.

"King Tut." Also, more than half believed that the New World had been discovered by Europeans long before Columbus. Whether this reflects student familiarity with the scientific archaeological work done at L'anse aux Meadows (Ingstad 1977) or, instead, the clearly unscientific work of Barry Fell (1976, 1980) cannot be determined from this study because of the unfortunate wording of the question.

Perhaps the most striking aspect of the results, as can be seen in Figure 1, is the extremely small component of the percentage of "believers" who expressed "strong" acceptance of the statements. At the same time, in each instance a very large percentage of the student sample admitted simply not knowing if the statement were true or not. This is a pattern that we will see repeated.

Figure 2 shows student opinions on three topics labeled "Antiquity" (5, 9, and 10 above). Impressively, most of the students in the sample express agreement with the notion of human physical

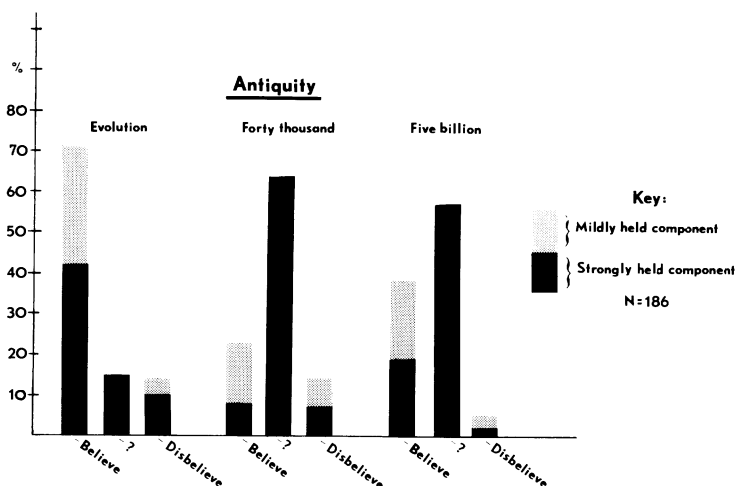


Figure 2. Student knowledge of scientific understanding of the past of the earth and the human species.

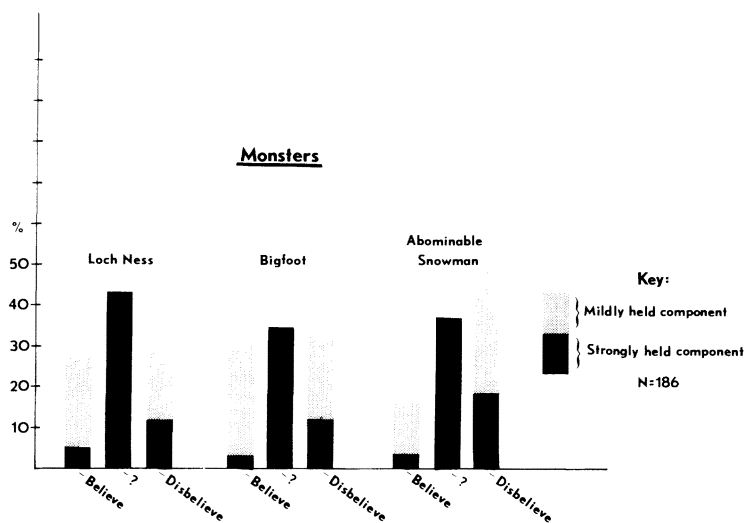


Figure 3. Student belief levels concerning the existence of a number of unsubstantiated animal species.

evolution, although fewer know the age of the earth and even fewer know that physically modern humans have been around for close to 40,000 years. Thus, except for general acceptance of human evolution, these students were by and large self-professedly ignorant of currently accepted scientific data about the geological and human past.

In terms of creatures of possible paleontological and/or evolutionary significance, Figure 3, labeled "Monsters" (1, 2, and 8 above), shows that the general pattern seen in Figure 1 recurs. Belief in the existence of questionable animal species hovers in the neighborhood of 30%. Again, strong believers were hard to come by, while students who confess their ignorance are the most common.

Figure 4, "Science and Religion," depicts responses to a number of questions related to students' attitudes towards science and religion as reflected in their reactions to the following statements:

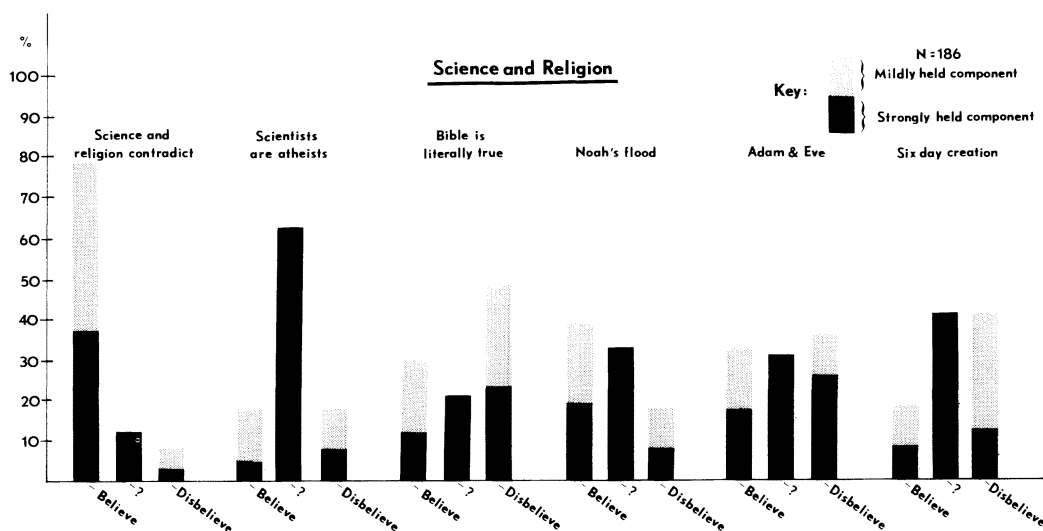


Figure 4. Student opinion levels on statements regarding science and religion.

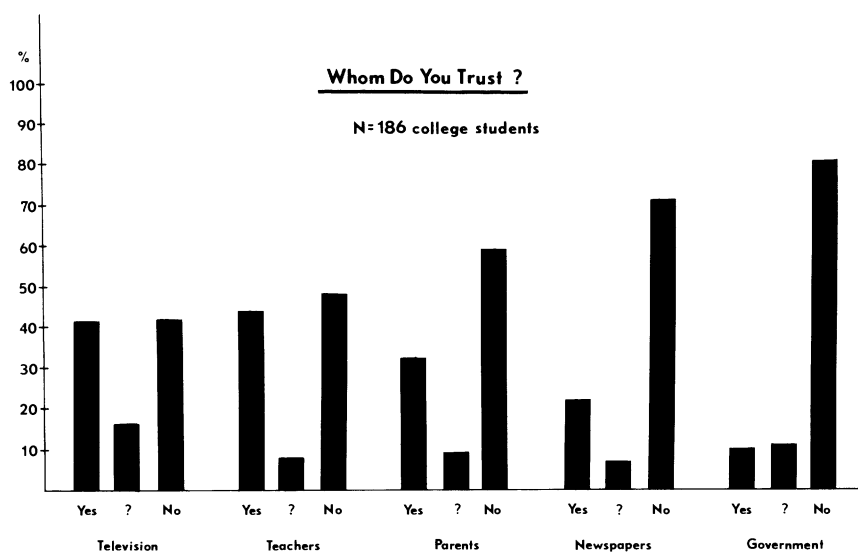


Figure 5. Student levels of trust concerning a number of information sources.

1. Science and religion often contradict each other.
2. Every word in the Bible is true.
3. The flood of Noah as told in the Bible really happened.
4. Adam and Eve were the first human beings.
5. Most scientists are atheists.
6. God created the universe in six actual, 24-hour days.

Here, students seem to be a bit more certain in their opinions. Interestingly, the great majority of them believe that science and religion are contradictory. Most do not know if this makes scientists atheists. In terms of Biblical questions, fairly high percentages accept the literal truth of the Bible, the reality of Noah's Flood, and the idea that Adam and Eve were the first human beings, though fewer of them believe in a six-day creation. However, the literal truth of the Bible, the six-day creation, and Adam and Eve also elicited rather high percentages of disbelievers.

Regarding the above results from the CCSU sample, it should be pointed out that where comparisons can be made, our results are similar to those of Bainbridge (1978) for the University of Washington at Seattle and to Cole's unpublished survey at the University of Northern Iowa (Cole, personal communication 1983). It seems likely that similar results would be obtained at most colleges and universities in the United States. The presumed exception to this would be for those opinion questions related to or impinging upon religious ideology. Even here, however, our results are not so dissimilar to national polls. Recent Gallup surveys (Gallup and Poling 1980) show that about 50% of all Americans believe that Adam and Eve were the first humans (compared to our figure of 33% for our university students) and 40% believe in the accuracy of the Bible (compared to our 30% who accepted the literal truth of the Bible).

A number of things appear clear. Among students there are very small percentages of "true believers" in unsubstantiated claims in archaeology and related fields. However, there are similarly very few who seem to know enough to be able to reject these same claims. Most simply say they do not know. Combined with their general interest in prehistory, we can see that we have a very large potential audience for archaeological absurdities. This leads us to one more set of questions—a kind of "whom do you trust?" about modern information sources.

Students were presented with a series of statements related to the reliability of five information sources, specifically: television, teachers, parents, newspapers, and the government (see Figure 5):

Table 2. Distribution of Emphasis Among Instructors Who Discuss Pseudoscientific Archaeological Claims.

| | Positive | Negative | Neutral |
|---------------------|----------|----------|---------|
| Ancient astronauts | 0.0% | 98.2% | 1.8% |
| Creationism | 1.0 | 89.4 | 9.6 |
| Barry Fell | 1.4 | 95.7 | 2.9 |
| Atlantis | 1.3 | 93.7 | 5.0 |
| Bigfoot | 4.2 | 77.1 | 18.7 |
| Noah's Ark | 3.6 | 83.9 | 12.5 |
| Tut's curse | 0 | 94.2 | 5.8 |
| Goodman | 0 | 97.8 | 2.2 |
| Psychic archaeology | 2.1 | 82.3 | 15.6 |
| Dowsing | 13.5 | 70.3 | 16.2 |
| Loch Ness | 2.4 | 75.6 | 22.0 |
| Footprints | 0 | 100.0 | 0.0 |

1. If a newspaper prints something, it must be true.
2. If they say that something is true on a non-fiction television program such as "That's Incredible," then it must really be true.
3. If you are told something by a teacher in a class, it must be true.
4. Our government always tells the truth to the American public when it comes to things that are not top secret.
5. If your parents tell you something, then it must be true.

As can be seen in Figure 5, teachers and television were viewed by the students in this sample as being the most reliable sources of information, followed rather distantly by parents and newspapers. Government here is not even in the same ballpark. The data should be viewed within the context of another statistic: 57% of these students get most of their information on world news and current events—and that would include archaeological current events—from television, a medium they seem to trust as being reliable.

The data point to some interesting implications. Within what is probably a generally healthy pattern of student skepticism regarding any established source of information, they do tend to believe teachers more than anyone else. This would seem to indicate that as teachers we have a good chance at shaping what these students know about, and how they conceive of, the human past. However, it is equally clear that teachers have an extraordinary challenge to meet in the form of the powerful flickering cathode ray tube. That is, while students might be predisposed to believe archaeological classroom pronouncements, they are similarly and about equally disposed to believe as valid, archaeological data presented on the television.

PROFESSIONAL QUESTIONNAIRE

In the first week of February 1983, questionnaires (Appendix 2) were sent to 610 professional teaching archaeologists in the United States. As of April 1, 1983, 349 responses had been received (a 57% return rate). Three hundred and forty contained codeable responses and these form the basis for the following analysis.

People were asked a series of 12, two-part questions. The first of each set of questions asked if, in their introductory anthropology, archaeology, or prehistory courses, respondents brought up and discussed the following topics:

1. ancient astronauts
2. creationism
3. the hyperdiffusionist hypotheses of Barry Fell
4. the lost continent of Atlantis
5. Bigfoot
6. Noah's Ark

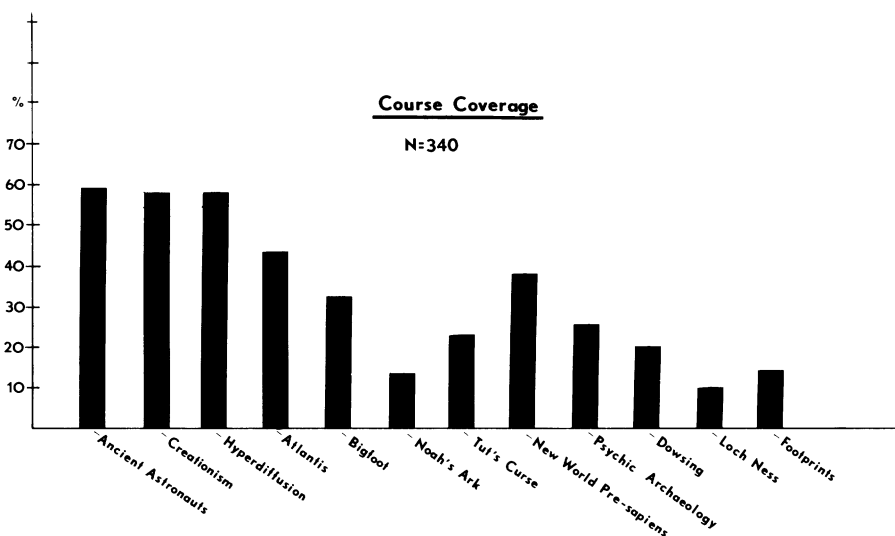


Figure 6. Course coverage by teaching archaeologists of a number of extreme claims about the past and its study.

7. the curse on the tomb of Tut-ankh-amen
8. pre-sapiens evolution in the New World
9. psychic archaeology
10. archaeological dowsing
11. the Loch Ness Monster
12. the contemporaneity of dinosaur and human footprints.

Part "b" asked those who responded affirmatively to each respective question, if the topic was presented in a positive or negative light. This was crucial to the analysis. It was necessary to know whether college students were being educated about the many pseudoscientific claims being made in the popular media in the name of prehistory and archaeology. I assumed that professional archaeologists would not be the source of popular misconceptions, but I wanted to be certain of this.

A number of respondents took me to task for my positive/negative characterization, but I stand by it. Of course the distinction referred to evidence and proof, not the metaphysics of the value of ideas, and most people interpreted the positive/negative distinction in the way it was intended. Many also added a category of "neutral" in their responses and this was included in the analysis.

Survey results appear as Figure 6 and Table 2. Fortunately, Bainbridge seems largely mistaken in his assumption that our profession as a whole does not educate our students in terms of pseudoscientific archaeological claims made in the popular media. As can be seen in Figure 6, very nearly three-fifths of the respondents discuss ancient astronauts, creationism, and hyperdiffusionism. The other topics received lower, although generally respectable, levels of coverage by respondents.

Table 2 shows the respondents' answers to the second part of each question. Not surprisingly, archaeologists who discuss these topics have little sympathy for ancient astronauts, creationism, Barry Fell, Atlantis, Tut's curse, Goodman's claims, or the claimed contemporaneity of dinosaur and human footprints. Interestingly, dowsing attained a rather high positive coverage response, and a number, including Bigfoot, creationism, Noah's Ark, psychic archaeology, dowsing, and the Loch Ness Monster attained fairly high percentages of volunteered "neutral" coverage responses. Nonetheless, it seems rather clear that teaching archaeologists are skeptics (in the most complimentary sense) and attempt to impart that skepticism to their students. For the most part, untestable "theories," unsupported claims, invalidated hypotheses, unverified statements, and outright lies about the past and its study are presented as such.

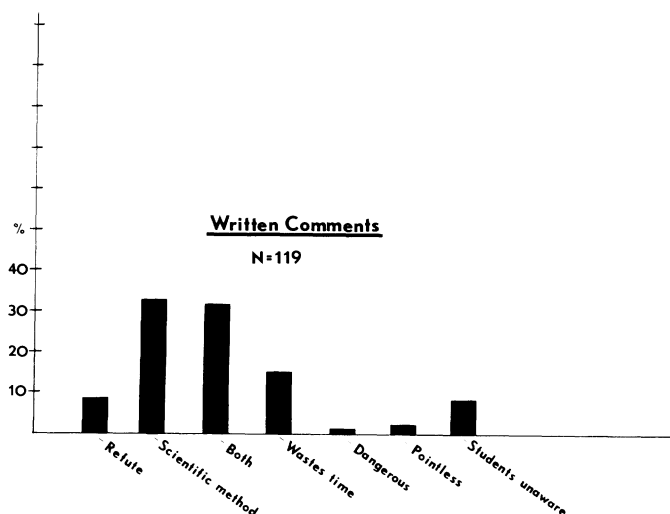


Figure 7. Percentages of written response types provided by professional archaeologists who answered the survey and who added written comments.

At the end of the survey I asked people to provide any explanatory comments. Of the 340 respondents, 181 (53.2%) did so. Of these 181 written responses, 62 (34.3%) were simply specific clarifications (things like "I present creationism in a neutral way mainly because I teach in the a) south, b) midwest, c) far west, d) other").

The other 119 written comments can be broken down into seven general response types:

1. It is best to refute specific pseudoscientific claims.
2. It is best to focus on the scientific method.
3. It is best both to refute specific claims and to discuss the methods of science.
4. It is a waste of time to deal with absurdity.
5. It is dangerous to bring these things up in the first place.
6. It is pointless to deal with these topics because you cannot convince the "true believers."
7. It is pointless to deal with these topics since most students have never even heard of them.

Figure 7 shows the distribution of the written responses. Viewed cumulatively there is a definite consensus among respondents that these topics need to be covered, although there is a sizeable minority who feel that they are best ignored.

We can conclude from these results that teaching archaeologists, as a general rule, do in fact take up many of the extreme claims of an archaeological nature presented in the popular media. Most live up to what is here seen as a crucial responsibility: providing students with the necessary intellectual tools, both in terms of scientific method and specific archaeological data, to assess archaeological claims intelligently.

Parenthetically, it should also be pointed out that a number of professionals go beyond the classroom and publish, both in scientific and popular journals, responses to some of the extreme claims made by the "pseudo-archaeologists." Beyond the already mentioned monographs of Wauchope (1962) and Cazeau and Scott (1979), there have been a number of professional responses to psychic archaeology (Cole 1978; Feder 1980a; McKusick 1982), ancient astronauts (Feder 1980b), Atlantis (Galanopoulos and Bacon 1969), Bigfoot (Napier 1973), Goodman's *American Genesis* (Fagan 1981; Stanford 1981; Turner 1981; Feder 1983), Fell's hyperdiffusionism (Cole 1978, 1979, 1981, 1982; Neudorfer 1980; Gradie 1981; McKusick 1981; Snow 1981; Ross and Reynolds 1978; and also see Kra 1981), Noah's Ark (Moore 1983), the claimed contemporaneity of dinosaur and human footprints (Godfrey 1981a; Cole 1983), and especially "scientific" creationism (Godfrey 1981b, 1983; Newell 1982; Eldredge 1982; Pastner and Haviland 1982; and many others).

A number of general works also respond to extremist archaeology (White 1974 and the volume edited by Sabloff 1982). Also, see the journal *The Skeptical Inquirer* for a wide variety of articles on the scientific investigation of extreme claims related to a number of disciplines, including archaeology. The journal *Creation/Evolution* is devoted to the scientific response to, and analysis of, creationism in its many guises.

Beyond this, professionals from other fields have also published important works related to extreme archaeological claims (for example, the astronomer Krupp 1978 and 1983 in archaeoastronomy). It should also be added that there are a number of similarly valuable popular works written by science writers (for example, Story 1976 and Cohen 1976 on ancient astronauts and De Camp 1954 on Atlantis).

CAN WE HAVE AN EFFECT?

Are we being effective as educators? Are our attempts to have students think rationally and critically about the past working, and are they successful over the long haul? A definitive answer to these questions cannot be provided here, but a few suggestions can be made based on our experience at CCSU through an analysis of a series of cross tabulations of the student questionnaire responses.

Using the answers to the basic personal background questions as the independent variables and the responses to the 50 opinion questions as the dependent variables, I produced a large series of correlation tables and chi-square analyses.

With few exceptions, the demographic or personal variables could not be significantly correlated with any of the opinion variables. Age, sex, year in college, major, political leaning, parents' education, and grade point average seemed to be unrelated to students' opinions on extreme claims about the past. This is again quite similar to Bainbridge's (1978) findings. There were some interesting exceptions. Computer and business majors were more likely to believe in the literal truth of the Bible and people whose major source of news was television were more likely to believe in the lost continent of Atlantis.

However, of greater interest and importance is the fact that courses taken often had an impact on student opinions on archaeological and related topics. Students in the sample who had taken a course in archaeology wherein a number of these issues, including ancient astronauts and creationism were addressed, were in fact less likely (chi-square significance at $p < .05$) to agree with notions of ancient astronauts, Tut's curse, or the existence of Noah's Ark, than were students with no coursework in archaeology. Similarly, students who had taken biology were less likely to accept Bigfoot or ancient astronauts than those with no biology. Students with coursework in psychology were also less likely than those with no psychology to believe von Däniken.

While we appear to have been at least partially successful, the question still remains: What is the most effective approach in the classroom? It is here maintained that ignoring extreme archaeological claims that appear in popular media may be construed by students as acquiescence. Lack of response may be interpreted as inability to respond.

Also, the mere presentation of data in rebuttal to extreme claims is problematical. While archaeological "facts" as such are, of course, important parts of our arguments, facts are not sufficient in responding to extreme claims. We must never allow our arguments to become couched in terms of "our data" versus "their data"; students have no way of deciding whose "facts" are correct. It is similarly inappropriate to argue from authority along the lines, "believe me because I have a degree in anthropology." This is neither effective nor reasonable—Jeffrey Goodman also has a degree in anthropology.

However, students can be shown how science operates and how, specifically, archaeologists go about the task of attempting to explain the past. The lesson of scientific epistemology is both crucial and effective.

It should be added that epistemology is not sufficient. Student thinking may be so compartmentalized that simply explicating the inferential process used in, for example, the Tehuacan Valley Project (MacNeish 1964) does not guarantee that they will recognize the lack of science in von Däniken's reasoning. It is here suggested that it is probably best to be specific and factual at the

same time that we are showing the difference between science and pseudoscience. For example, discuss the Nazca ground-drawings or geoglyphs. Compare von Däniken to the work of Kosok and Rieche on the Nazca material (see Kosok and Reiche 1947; Kosok 1965). Compare Donnelly's hodge-podge of inductive, wishful thinking about Atlantis to Galanopolous and Bacon's (1969) multiple-working hypotheses. In other words, neither generalization of the scientific method nor specific factual refutation is sufficient. We will probably succeed only through the employment of both.

Finally, with a grasp of the workings of archaeological science and with exposure to a number of clear, specific comparisons, students can be helped not only to recognize pseudoscientific archaeology, but to understand why it is, indeed, pseudoscience.

CONCLUSIONS

To reiterate and emphasize what was said previously, students are largely ignorant of archaeology and related topics. They are at the same time interested in knowing about these sorts of things. Combined with their rather high confidence in the reliability of information presented on television, they are a ripe audience for the pseudoscientists and charlatans who parade as archaeologists and would have the public accept all sorts of unacceptable nonsense about the past and its study.

However, these same students are relatively trusting of their professors and it seems that we can have a positive impact on their opinions. Clearly we are at a tremendous disadvantage. The three hours or so per week for 15 or 20 weeks that we have their attention, cannot compare with the barrage of archaeological nonsense with which they are assaulted during the rest of the time (and, it should be added, the rest of their lives). But, to throw up our hands and simply ignore the problem because it seems intractable is a disservice, both to our students and to our discipline.

In closing, I can only conclude that, as difficult a struggle as it may sometimes seem, we must continue to respond rationally to the irrationality that dogs our discipline. To say that there is not time in an introductory course to confront these sorts of issues is a poor excuse for avoiding what may be an unpleasant responsibility. If we allow fantasies of the past to be presented as fact with no response, we become accessories in the misinformation and miseducation of our students and the public at large. If we abrogate this responsibility and if, in the future, circumscribed government research money is spent looking for non-existent lost continents, if our children are taught in the secondary schools that human cultural evolution can be understood only by reference to the visits of ancient astronauts, and if regional surveys are conducted by bands of pendulum-swinging psychics, we must surely share in the blame along with the purveyors of pseudoscience.

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APPENDIX 1

THE FOLLOWING QUESTIONNAIRE HAS BEEN DESIGNED AS PART OF A STUDY OF THE IDEAS STUDENTS HAVE ABOUT SEVERAL SCIENTIFIC, RELIGIOUS AND VARIOUS POPULAR TOPICS. THE QUESTIONNAIRE IS DIVIDED INTO TWO PARTS; THE FIRST PART CONCERNS SOME BACKGROUND ON YOURSELF (BUT WE DO NOT WANT YOUR NAME OR STUDENT NUMBER—YOU WILL REMAIN ANONYMOUS). IN THE SECOND PART WE WILL ASK YOU YOUR OPINIONS ON A NUMBER OF TOPICS. PLEASE FILL OUT THIS FORM AS BEST YOU CAN. PLEASE BE TRUTHFUL—WE REALLY ARE INTERESTED IN WHAT YOU THINK! THANK YOU VERY MUCH FOR PARTICIPATING IN THIS STUDY!

I. BACKGROUND ON YOURSELF

- | | | |
|--|-------|---|
| 1) Age | _____ | |
| 2) Sex | _____ | 1 = male, 2 = female |
| 3) Year in college | _____ | 1 = freshman, 2 = sophomore, 3 = junior, 4 = senior |
| 4) Your approximate grade point average. | _____ | 0 = F, 1 = D, 2 = C, 3 = B, 4 = A |
| 5) Your major | _____ | |
| 6) Religious affiliation | _____ | 1 = Catholic, 2 = Protestant, 3 = Jewish, 4 = Born again Christian, 5 = none, 6 = Atheist, 7 = other |
| 7) About how often do you attend religious services in a year? | _____ | 1 = 100 times, 2 = 50 times, 3 = 10 times, 4 = 2 times, 5 = none |
| 8) Have you ever taken a college or high school course (before this semester) in: | _____ | |
| | _____ | ARCHAEOLOGY 1 = yes, 2 = no |
| | _____ | HISTORY 1 = yes, 2 = no |
| | _____ | PSYCHOLOGY 1 = yes, 2 = no |
| | _____ | BIBLE STUDIES 1 = yes, 2 = no |
| | _____ | ASTRONOMY 1 = yes, 2 = no |
| | _____ | LOGIC 1 = yes, 2 = no |
| | _____ | GEOLOGY 1 = yes, 2 = no |
| | _____ | BIOLOGY 1 = yes, 2 = no |
| | _____ | SCIENCE 1 = yes, 2 = no |
| 9) Where do you get most of your world news and current events? | _____ | 1 = television, 2 = radio, 3 = newspaper, 4 = magazines, 5 = talking to friends |
| 10) Which is your favorite type of television show? | _____ | 1 = comedy, 2 = police drama, 3 = cartoons, 4 = documentary, 5 = science fiction, 6 = soaps, 7 = news, 8 = music, 9 = science, 10 = none |
| 11) How many books, on the average, do you read in a year, not required by school courses? | _____ | 1 = none, 2 = one or two, 3 = between three and ten, 4 = more than ten |
| 12) Which is your favorite type of book? | _____ | 1 = detective mysteries 2 = historical novels, 3 = plays, 4 = romance, 5 = science fiction, 6 = popular science books, 7 = other, 8 = none |
| 13) How far did your father get in school? | _____ | 1 = elementary school, 2 = junior high, 3 = high school, 4 = college, 5 = graduate school |
| 14) How far did your mother get in school? | _____ | 1 = elementary school, 2 = junior high, 3 = high school, 4 = college, 5 = graduate school |
| 15) Politically, you consider yourself to be | _____ | 1 = conservative, 2 = moderate, 3 = liberal, 4 = radical |

PLEASE GO ON TO THE NEXT PAGE AND COMPLETE THE QUESTIONNAIRE

II. Now we are interested in getting your opinions on a number of topics. Please answer these honestly and as fully as you can. Remember, this is completely anonymous.

USE THE FOLLOWING SCALE TO RATE YOUR OWN ATTITUDES ON THE STATEMENTS WHICH FOLLOW:

- 1 = STRONGLY BELIEVE
2 = MILDLY BELIEVE
3 = DON'T KNOW
4 = MILDLY DISBELIEVE
5 = STRONGLY DISBELIEVE

- _____ 1) Some people have the ability to predict future events by psychic power.
_____ 2) Some people can read other people's thoughts by psychic power.
_____ 3) If a newspaper prints something, it must be true.
_____ 4) The Loch Ness Monster really exists.
_____ 5) Astrology is an accurate predictor of future events.
_____ 6) UFO's are actual spacecraft from other planets.
_____ 7) There is a God.
_____ 8) If they say that something is true on a non-fiction television program such as THAT'S INCREDIBLE, then it must really be true.
_____ 9) Life was better long ago.
_____ 10) It is good to be skeptical about things.
_____ 11) Science and religion often contradict each other.
_____ 12) Astrology is an accurate predictor of people's personalities.
_____ 13) Cars capable of very high mileage (over 100 MPG) can be built, but the oil companies are preventing this.
_____ 14) Life will be better in the future.
_____ 15) It is possible to communicate with the dead.
_____ 16) "Bigfoot" is a real animal roaming the woods in the American Northwest.
_____ 17) Aliens from other worlds visited the earth in the prehistoric past.
_____ 18) Humans are more intelligent today than in the prehistoric past.
_____ 19) There is good evidence for the existence of the Lost Continent of Atlantis.
_____ 20) Human beings came about through evolution.
_____ 21) If you are told something by a teacher in a class, it must be true.
_____ 22) Some people have the ability to move things with their minds.
_____ 23) Nothing can go faster than the speed of light.
_____ 24) Every word in the Bible is true.
_____ 25) An ancient curse placed on the tomb of the Egyptian pharaoh King Tut actually killed people.
_____ 26) Our government always tells the truth to the American public when it comes to things that are not Top Secret.
_____ 27) America was discovered by Europeans many years before Columbus.
_____ 28) God created the universe.
_____ 29) Time travel is possible.
_____ 30) Some races of people are more intelligent than others.
_____ 31) The world will be destroyed in a nuclear war in the not too distant future.
_____ 32) Prayers are usually answered.
_____ 33) Reincarnation is an established fact.
_____ 34) If your parents tell you something, then it must be true.
_____ 35) The flood of Noah as told in the Bible really happened.
_____ 36) Sick people can sometimes be healed by faith and prayer alone.
_____ 37) Our government is hiding information about the truth of UFO's.
_____ 38) There are people who, under hypnosis, can remember their past lives.
_____ 39) Life is fair.

- _____ 40) There is a mysterious force operating in the Bermuda Triangle.
- _____ 41) The Abominable Snowman is a real creature living in Tibet.
- _____ 42) People can become possessed by evil spirits.
- _____ 43) Ghosts are real.
- _____ 44) Adam and Eve were the first human beings.
- _____ 45) Science produces far more good than bad.
- _____ 46) There is intelligent life somewhere out there in the universe.
- _____ 47) Most scientists are atheists.
- _____ 48) The world is about 5 billion years old.
- _____ 49) God created the universe in six actual, 24-hour days.
- _____ 50) Human beings biologically just like us have been around for about 40,000 years.

APPENDIX 2

QUESTIONNAIRE

IN YOUR INTRODUCTORY ANTHROPOLOGY/ARCHAEOLOGY/PREHISTORY COURSES, DO YOU BRING UP AND DISCUSS THE FOLLOWING TOPICS (PLEASE ANSWER EITHER "YES" OR "NO" FOR QUESTIONS 1-12 AND EITHER "POSITIVE" OR "NEGATIVE" FOR QUESTIONS 1A-12A)

- | | |
|--|-------|
| 1) The theory that "ancient astronauts" had a significant impact on human physical and cultural evolution? | _____ |
| 1a) If yes, do you present it in a positive or negative light? | _____ |
| 2) Creationism? | _____ |
| 2a) If yes, do you present it in a positive or negative light? | _____ |
| 3) The theory that the New World was visited by pre-Columbian Celts, Libyans, Egyptians, and so on, all of whom left written records of their visits (the theory of Barry Fell)? | _____ |
| 3a) If yes, do you present it in a positive or negative light? | _____ |
| 4) The existence of the Lost Continent of Atlantis? | _____ |
| 4a) If yes, do you present it in a positive or negative light? | _____ |
| 5) The existence of Bigfoot, Sasquatch or the Abominable Snowman? | _____ |
| 5a) If yes, do you present it in a positive or negative light? | _____ |
| 6) The existence of Noah's Ark? | _____ |
| 6a) If yes, do you present it in a positive or negative light? | _____ |
| 7) The notion that there was a "curse" on the tomb of Tut-ankh-amen? | _____ |
| 7a) If yes, do you present it in a positive or negative light? | _____ |
| 8) The theory that our pre-sapiens hominid ancestors originated in the New World? | _____ |
| 8a) If yes, do you present it in a positive or negative light? | _____ |
| 9) The use of "psychic" power to locate or interpret archaeological sites? | _____ |
| 9a) If yes, do you present it in a positive or negative light? | _____ |
| 10) The use of dowsing to find archaeological material? | _____ |
| 10a) If yes, do you present it in a positive or negative light? | _____ |
| 11) The Loch Ness Monster (or other similar alleged lake dwelling creatures)? | _____ |
| 11a) If yes, do you present it in a positive or negative light? | _____ |
| 12) The existence of dinosaur and human footprints in the same stratum in a deposit in Texas? | _____ |
| 12a) If yes, do you present it in a positive or negative light? | _____ |

If you have any further comments please provide them here and, if necessary, continue on the back of this page. Again, thank you very much for your time.