

Society and Scientific Anomalies: Common Knowledge About the Loch Ness Monster

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Abstract—The public image of the Loch Ness monster is that of a mythical creature appropriately talked of in a joking manner. The sporadic and often jocular coverage of the subject in the press is consistent with that image. But magazine articles since the 1950s have tended to project a belief in the reality of the animals; the books on the subject even more so. Thus the public view and that purveyed by the mass media are at variance with the views of those who have studied the matter closely and recently. The public image still reflects the consensus of 50 years ago, when the subject first made news: editorial policies governing press coverage of the Loch Ness controversy are an instructive exemplar of how and what society learns about scientific anomalies.

In science, observational and theoretical claims are made and judged under well-established conventions. Apparatus, methods, modes of analyzing data are clearly specified by the claimants, and such specification is made easy by the fact that practitioners are trained within a shared tradition. Further, problem-solving proceeds on the basis of a pre-existing consensus as to what the problem is and, to a considerable extent, what the relevant data are.

That well-ordered state of affairs does not obtain where anomalies are concerned: there, it is not clear whether the problem is the actual existence of an anomaly (something that does not fit accepted theory) or whether the anomaly is an artefact of sampling, an experimental or observational error, or the like. Anomalies that surface within established specialities are, over the long haul, resolved by the same well-established traditions, among which orderly, refereed publication under tight rules of documentation and citation is of significant importance. But, at any given time, some anomalies lie outside any existing scientific speciality (or, it is not clear in which speciality they belong): for example, acupuncture (until quite recently) or UFOs. In such instances, even the documentation, verification, classification of the most rudimentary data are problematic. In many cases, for example, one wonders whether folklore, legend, and myth provide relevant data; and if so, in what manner? On the

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question of sea-serpents, for instance—are tales of dragons relevant or not? And if so, relevant in the sense that they indicate that our forebears were inspired to such tales through sighting sea-serpents, or in the sense that our exposure to tales of dragons predisposes us to think mistakenly that we see sea-serpents under appropriate conditions?

Attempts to answer such questions lead to consideration of what has been written? by whom? when? how published? how verifiable? And these questions—interesting in themselves in many ways—need to be answered before the "objective" problem and data can be identified and solved. In short, where subjects are concerned that are anomalous, that could perhaps become matters of science but are not yet classed as such, analysis of the modes of transmission of the possibly relevant knowledge is a necessary endeavor. Westrum (1977, 1978, 1979) has discussed the social processes by which knowledge about (claims of) scientific anomalies has been transmitted and preserved in relation to UFOs, meteorites, and sea-serpents. The case of the Loch Ness monster also lends support to some of the generalizations adduced by Westrum: (a) fear of ridicule inhibits the reporting of anomalous events; (b) the rates of reporting and of publishing of reports are determined by the social demand for such reports and not by the rate of occurrence of events; (c) skeptics and debunkers frequently assume that a lack of reports reflects a lack of events, but this inference is invalid; (d) it is often, again invalidly, argued that if the phenomenon were real then Science would already know of it. However, the primary concern here will be to characterize the manner in which the Loch Ness controversy has been portrayed in magazines and newspapers, and the relationship between that and the popular view of the Loch Ness monster.

Method of Investigation

Collecting the Literature

A crucial difference between the literature on anomalies and that of science is the lack of organization of the former. On a scientific topic, one can reasonably expect to find almost all the relevant literature through the use of indexes, collections of abstracts, specialized journals, and contacts within the "invisible college." By contrast, one can be rather certain that one's coverage cannot be complete of items relating to such a subject as the Loch Ness monster. So it is necessary to begin here with a discussion of how the relevant literature was sought, and to consider how the analysis might be biased by the failure to locate some unknown number of items.

This study aims to characterize that knowledge about Loch Ness that is available to, and thus influences, the society as a whole. So the literature that is most difficult to trace and obtain is not of major concern here—the ephemeral bulletins, newsletters, reports, etc., which are issued by short-lived organizations and which circulate among that very small group of people that has a special interest in the subject. (The author has, however, had access to

a considerable portion of this material about Loch Ness for nearly two decades and this also served as one way of finding books that have been published and articles in established periodicals.)

"Books in Print" served to locate some works. Various indexes of periodicals were searched: Reader's Guide; International Index (later, Social Sciences and Humanities Index, later separated); Cumulated Magazine Subject Index 1907–1949; Popular Periodical Index; British Humanities Index; Monthly Periodical Index. Citations in the books and articles so found naturally led to other items. A preliminary bibliography was circulated to others who have been interested in the subject, and more items were collected through the help of those individuals, most notably Jean Berton, Tim Dinsdale, Bernard Heuvelmans, Roy Mackal, Marcello Truzzi, Ron Westrum, Constance Whyte. Ultimately, more than 30 books and nearly 350 items in regularly published periodicals were obtained (in addition to much miscellaneous material that is not of concern here). (This article deals only with items published in English, though some pieces in other languages were found and read.)

The coverage of newspapers was limited to ones that are indexed, and two to which the author subscribed for a dozen years (*Louisville Courier-Journal* and *Lexington (Kentucky) Herald-Leader*). In view of their influential nature, the *London Times* and the *New York Times* were important, and indexes are fortunately available. On the subject of Loch Ness, it seemed essential that at least one regional (Scottish) newspaper be included. The first choices might have been the *Inverness Courier* and the *Scotsman*, which reported regularly about the monster, but indexes were not available; as a reasonable alternative, the *Glasgow Herald* was used, which made indexes available until 1969. Nearly 200 items were obtained from the *Glasgow Herald* (1933 to 1969), more than 150 from the *London Times* (1933 to 1983), and 115 from the *New York Times* (also 1933 to 1983). Choice of 1933 as the starting point was dictated by the fact that the Loch Ness monster first attained national and international prominence in that year.

Also of interest are the actual numbers of sightings and reports of sightings. Here there enter some additional uncertainties—most obviously, that some of these are hoaxes or obviously mistaken identifications. For want of a better alternative, the assessments of otherwise reliable authors were accepted in counting reliable sightings of what were not obviously tree-trunks, swimming stags, cattle, and so forth; particular reliance was placed on the works of Gould (1934), Whyte (1957), and Mackal (1976), leading to some 305 reports of sightings from 1933 to 1969. (Since this analysis was carried out, a comprehensive list of sighting reports has been made available by Ulrich Magin (see Bauer, 1986), but Magin seeks to list *all* reported sightings including mistaken identifications.)

Coding the Data

Answers were wanted to a number of questions: to what degree has the Loch Ness monster been treated seriously as opposed to jocularly? Has there

been a change in attitude since 1933? Are there differences in attitude in different portions of the literature (for example, between scientific journals and general-interest periodicals)? How factually reliable are the various types of literature?

Thus, coding of certain features was called for. Newspaper reports were categorized as news items, letters, editorial comment, or features with by-line; and each item was scaled for attitude (+2 for belief through 0 for neutral to -2 for disbelief) and for jocularity (from 0 for not jocular to +2 for entirely jocular). Magazine articles were similarly scaled for attitude and jocularity; and also for reliability (from 0 for no factual errors to -2 for totally erroneous); for length (up to 1 paragraph; 1 paragraph to 2 pages; more than 2 pages); and for type of magazine (for an audience of scientists; popular science for a general audience; general-interest or mass-circulation; special-interest or small circulation; and specializing in anomalies). Chapters or sections of books were treated in the same way as magazine articles. (Not included were book reviews, fiction, and such miscellanea as guide-books and pamphlets.)

Books dealing exclusively or mainly with the Loch Ness monster have already been characterized in an annotated bibliography (Bauer, 1980, 1982): all the books but one are written by more-or-less convinced believers in the reality of large animals in Loch Ness and the books vary from completely trustworthy to totally unreliable; those features are often met within the literature about anomalies—"fan" and "pro" books usually far outnumber the "debunking" works, and such scholarly virtues as reliable citing of references are frequently absent. (After the present analysis had been completed, two more books by disbelievers were published (Binns, 1983; Campbell, 1986) as well as the author's (Bauer, 1986) analysis of the controversy.)

The coding was done by the author. To obtain an estimate of reliability of the coding, every tenth article (chosen chronologically) was independently scaled for "attitude" by Susan Miller, who had initially no familiarity with the subject; her scaling agreed precisely with that assigned by the author for 71% of the items, and differed by only an average of 0.4 on the five-point scale for the whole sample. Scaling of the other items ought to be less sensitive to subjective bias—with the possible exception of "reliability." Perforce, however, the identification of errors of fact requires one who is thoroughly familiar with the body of literature but who is thereby also likely to have definite views. The author happens to believe that the Loch Ness monsters are real, yet-to-be-classified animals; and he might thus be prone to scale as low in reliability articles expressing disbelief, solely for that reason. There seems to be no solution to this dilemma, which involves the data in Table 11 and conclusions drawn therefrom; but as a rudimentary safeguard, I give here examples of what I regarded as clear errors of fact: Eyewitness descriptions evidence little agreement among one another (Anonymous, 1934a, 1934b; Burton, 1960a; Stewart-Gordon, 1977; Sweeney, 1977); on the other hand, they agree on a kraken-like (Mercatante, 1974) description, or one entailing a whiskery head and eight humps (Anonymous, 1937); and sightings have

never been made by more than one little knot of people at a given time (Gordon, 1978). Only one photograph has been obtained in 50 years (Sturdivant, 1976); presumably, the Surgeon's photograph, which has (again, mistakenly) been said to show the back (Stewart-Gordon, 1977) as well as the neck and head, to have been taken near Urquhart (Sweeney, 1977) in 1933 (Anonymous, 1976b; Walsh, 1976)—or, by the LNI (Loch Ness Investigation) at a range of four miles (Swan, 1976; Sweeney, 1976). Sightings and photographs are usually achieved under poor, misty conditions (Cohen, 1965; Sweeney, 1977; Walsh, 1976). Dinsdale filmed a motor-boat (Burton, 1960a, 1960b, 1962, 1969); the Royal Air Force unit which analyzed his film was (Sweeney, 1976) the official coordinating center for the search; the report on the film gave a possible length of up to 92 feet for the creature (Cohen, 1965, 1970; Holiday, 1966; Keel, 1970). The British government had earlier mounted an official investigation (Sweeney, 1977). Nowadays, Frank Searle is the most active monster-hunter (Gordon, 1978). The sonar unit used in 1968 by the team from Birmingham University was defective (Anonymous, 1968). From the focal length of a camera and the size of the negative, one can calculate the distance and size of a photographed object (Burton, 1962). Loch Ness has always been freshwater (Anonymous, 1968).

Notions of what is jocular are likely to be fairly uniform. Items were coded as "entirely jocular" when written tongue-in-cheek *throughout* with apparently no other purpose (Anonymous, 1934a, 1934b, 1937; Coren, 1976; Ford, 1934; Holden, 1974). "Definitely jocular" items contain very clearly expressed statements of a joking sort, but intermingled with serious or purportedly factual commentary (Anonymous, 1935, 1957, 1970; Gordon, 1978; Greenburg, 1974; Gregory, 1934; Klass, 1977; Mercatante, 1974; Swan, 1976). "Somewhat jocular" refers to items that evidence humor sufficiently gently that it does not necessarily imply disbelief in the reality of the **in**onsters (Anonymous, 1975, 1976a, 1977; Bartusiak, 1979; Graves & Hodge, 1950; Scheider & Wallis, 1973; Sheldon & Kerr, 1972). Though these may seem to be straightforwardly distinct categories, residual uncertainties are inevitable. For example, how to class the article by Carl Sagan (1976) that purports to estimate the number of monsters? If intended as humor, it is expressed so straightforwardly that many will miss the point; yet one hopes that no one would *seriously* consider applying to this question the assumptions and mode of calculation used in that piece.

There are some further points of possible ambiguity which, however, are hardly likely to bias the conclusions drawn in this study. For instance, it is not always obvious whether an item ought to be included at all: in 1933 and 1934, newspapers would have as a headline "Another Sea Monster Seen"—"another" clearly referring to the furor about Loch Ness, but without any explicit mention of it; should such items be included? (They were.) Then again, how to class the book by Campbell (1972) about Morag, the sister of Nessie in Loch Morar? As a book about the Loch Ness animals, or as one which contains a section only devoted to Loch Ness? And it is also not always obvious, how to classify a periodical, as between scientific, popular science,

and general interest (here, the likely readership was used as a criterion, so that *Nature* and *Science* were classed as "scientific," and *Wildlife* and *National Geographic* as "popular science," for example).

Discussion

Type of Literature, Chronologically

Table 1 lists the numbers of items of different types that have appeared during five-year periods (with a separate period for the initial flurry in 1933 and 1934).

Several things are immediately apparent:

1. After the 1930s, there is a general *lack* of correlation between numbers of (eventually reported) sightings and numbers of items in newspapers; with less discrepancy in the *Glasgow Herald* than in the *London Times* and *N.Y. Times* (see also Table 2).
2. In the late 1950s, there was a marked increase in the rates of publication of articles and books.

Evidently, different things determined the coverage given by newspapers and by magazines. I shall examine in more detail the behavior of the news-

TABLE 1
Frequencies of sightings and writings, 1933-1983
(numbers of items in each category)

	Reported Sightings ^a	In <i>Glasgow Herald</i>	In <i>London Times</i>	In <i>New York Times</i>	Articles in Periodicals	Chapters or Sections of Books	Books Solely or Chiefly about Loch Ness
1933-34	106	91	65	46	47 (80%) ^e	1	1
1935-39	27	35	21 ^b	3	5 (80%)	1	0
1940-44	17	1	1	0	2 (50%)	2	0
1945-49	12	8	0	2	5 (80%)	0	0
1950-54	22	13	3	2	7 (60%)	0	0
1955-59	16	10	1	1	16 (30%) ^f	4	1
1960-64	43	16	11	4	38 (70%)	2	2
1965-69	62	24	11	4	40 (25%)	3	4
1970-74	na	na	12	10	48 (35%)	7	8
1975-79	na	na	30 ^c	43 ^d	103 (35%)	16	14
1980-83 ^e	na	na	5	0	53 (40%)	5	2
Totals	305	198	160	115	346	41	31

^a See text for provenance.

^b 19 of these in 1938; see text.

^c 18 of these in 1975; see text.

^d 37 of these in 1976; see text.

^e Through mid-1983; the numbers were increased by 50% to make this period of 3½ years roughly comparable to the other, 5-year periods.

^f These percentages of the articles appeared in British (as opposed to American, Canadian, or Australian) magazines.

na—Not available to author.

TABLE 2
Numbers of newspaper items per reported sighting

	In <i>Glasgow Herald</i>	In <i>London Times</i>	In <i>New York Times</i>
1933-34	0.85	0.60	0.45
1935-39	1.30	0.80	0.10
1940-44	0.05	0.05	0.00
1945-49	0.65	0.00	0.15
1950-54	0.60	0.15	0.10
1955-59	0.65	0.05	0.05
1960-64	0.35	0.25	0.10
1965-69	0.40	0.20	0.05

Note. From data in Table 1.

papers, and then look further at the other literature. But first I shall seek to define the public attitude toward the monster.

The Public Image of the Loch Ness Monster

The Loch Ness monster rarely needs an introduction—few have not heard of it (or her, under the title of Nessie). The roller-coaster at Busch Gardens in Williamsburg, Virginia, is named in its honor. It is featured in television commercials—for example, a leathery back lifts out of the water a boat-load of kilted and tartan-capped men, in an advertisement for Kellogg's "Raisins, Rice and Rye," shown on U.S. television in 1981. Any serpentine shape coupled with a suggestion of tartan or whisky can, as every cartoonist knows, be used without more explicit identification. And Nessie has been featured in novels and short stories, for instance Charteris (1959), Hoyle and Hoyle (1971), Hughes (1964), Kellogg (1977), MacKenzie (1952).

Soon after Nessie became international news at the end of 1933, she became closely identified with sea serpents (Gould, 1933; Editorial, *Times*, December 9, 1933); and has thereafter shared the same public image—of a legendary, mythical, folklorish creature that some gullible people suppose to actually exist. Those who claim sightings are typically ridiculed: Burton (1961, p. 11), Dinsdale (1972, p. 58), Gould (1930, pp. 188, 189, 193), Heuvelmans (1968, p. 461), Whyte (1957, pp. 3, 42, 68, 75, 119, 157), Witchell (1974, pp. 128, 136). Pundits speak of Nessie in the same breath as they do of UFOs, yetis, P. T. Barnum, Atlantis, and so forth: see, for example, Cazeau and Scott (1979), Cohen (1965), Corliss (1976), *Daily Mail* (London; October 3, 1970), Frazier (1978), Goudsmit (1976), Nichols (1950), Sladek (1973), *Time* (12 December 1977, p. 100).

Nessie has, in fact, become the prototype and stereotype of the aquatic monster. Often, when such a creature is reported, it is described as "a South Pacific Nessie," for example, rather than as a South Pacific monster or sea-serpent (*Newsweek*, 1 August 1977, 77); or "Cherokees have own Loch Ness

monster" (Asheville(North Carolina) *Citizen-Times*, January 10, 1971, cited in Mackal (1980, p. 212)); and Nessie's existence serves to validate the search for a similar creature in Lake Champlain—for instance Vachon (1977) and Zarzynski (1984). A naturalist's sketched impression of a typical sea-serpent is also suggestive: his earlier sketch had resembled the shark-like mosasaurs, but subsequently he pictured the sea-serpent as a Nessie-like plesiosaur (Thone, 1937, 1949).

Belief that the Loch Ness monsters are real animals appears not to be widespread. According to a Gallup poll of 1978, only 13% of Americans believed in Nessie, comparable to the rate of belief in Bigfoot (13%) and ghosts (11%) and quite significantly less than that in clairvoyance (24%), astrology (29%), precognition (37%), demons or devils (39%), telepathy (51%), angels (54%), UFOs (57%) (Greenwell, 1980; Greenwell & King, 1980).

Nessie in the Newspapers

The **English** and the American national dailies have devoted approximately the same amounts of space (or lack thereof) to reporting events from Loch Ness (Tables 1 and 2). The similarity becomes even more striking when three distinct events are identified: in 1938, a proposed expedition excited a flurry of interest in Britain but not in the U.S.—19 of the 21 items in the *London Times* during 1935–1939 appeared on that occasion; in 1975, an announced and then cancelled symposium in Edinburgh, and a presentation at the Houses of Parliament, was responsible for two thirds of the 30 items in the *London Times* in the years 1975–1979; whereas the *New York Times* had, during 1976, more than three fourths of all the items that it published in the five years 1975–1979 and the tone of the coverage was much more positive than in other years (Table 4)—because it sponsored an expedition during that year (Pollak, 1976; Swan, 1976). Thus the Loch Ness story was judged equally newsworthy by national dailies in both countries, briefly, in 1933 and 1934, and equally not worth covering thereafter (except for the special occasions alluded to above).

But there is a clear difference between the *Glasgow Herald* and the national dailies. The frequency with which Nessies are mentioned in the *Herald* parallels quite closely the frequency of ultimately reported sightings (Tables 1 and 2)—about one published item for every two sightings rather regularly since the mid-1930s. By contrast, the items in the national dailies are drastically fewer (except at the "flap" times of 1933–34, 1975, and 1976) and show no correlation with the number of sightings. That difference is even more striking when the nature of the coverage is examined. Almost all the items in the *Glasgow Herald* (well over 90%), are purportedly factual accounts, without jocularity or editorial comment; but in the *London Times*, about half the items are letters to the editor, and another 1 out of every 12 is a feature story or editorial.

The *Glasgow Herald* appears not to have changed its approach from the very beginning: the possible reality of large animals in the loch was and is

TABLE 3
Frequencies of sightings and newspaper items, 1933-1934

	Reported Sightings ^a	Items in <i>London Times</i>	Items in <i>Glasgow Herald</i>
1933			
May	3	—	—
June	4	—	—
July	2	—	—
August	15	—	—
September	7	—	—
October	8	—	1
November	7	—	2
December	11	29	16
1934			
January	7	17	15
February	4	0	3
March	0	1	4
April	3	1	6
May	4	1	9
June	6	1	4
July	17	1	11
August	7	6	7
September	1	3	5
October	0	1	5
November	0	2	1
December	0	2	2
Totals	106	65	91

^a See text for provenance.

judged to be of interest, relevant items were and are printed, and so coverage has roughly tended to increase and decrease with the rate of reported sightings over the years (though at least half of the eventually reported sightings were not published contemporaneously).

The *London Times* apparently could not tolerate such a **sitting-on-the-fence** posture over several decades. Further detail is given in Table 3, of sightings and of items in the *Times* and in the *Herald*, by the month, during 1933 and 1934. The *Times* first mentioned on December 8, 1933, the excitement aroused over Loch Ness, and on the following day carried an editorial and a lengthy feature by Rupert Gould, who had visited the loch, interviewed eye-witnesses, and concluded that a sea-serpent had become trapped in Loch Ness. The editorial, though somewhat tongue-in-cheek, left open the possibility that Gould might be right. During the next month or so, the *Times* published three dozen letters and a dozen-and-a-half news items. But on January 18, 1934, an editorial virtually called a halt: "The creature . . . is clearly of a retiring disposition, with an abnormal, a truly monstrous, dislike of publicity . . . 'tis gone—gone rather stale by now, perhaps, and ere very long to be gone west." So the *Times* had decided that Nessie was a myth, and for the subsequent 50 years translated that conclusion into a decision not to report

events at or about the loch (with the already noted exceptions in 1938 and in 1975).

Monster buffs could thus be tempted to contrast the open-minded Herald with the dogmatic Times. But it might be more accurate simply to note that each paper determined quite early what its attitude ought to be, and then stuck with that decision over five decades—during which time a great deal has happened at the loch: enough to produce a striking increase in the rate of publication of books and magazine articles (Table 1) and a marked change in the attitude expressed in those articles (Table 5 and related text, *below*)—not enough, however, to alter the stance taken by the daily newspapers. I have been unable to locate general studies of daily newspapers to **determine** whether such rigidity is characteristic of their treatment of a wide range of topics or whether it occurs only in some areas. But at least one amusing instance of that rigidity on the present subject has been pointed to previously: in 1970, the Oban Times (west coast of Scotland) stated that it had refused to print anything about aquatic monsters since the hoax perpetrated in the west of Scotland in 1877! (Campbell, 1972, p. 102)

One should recognize that there was, in 1934, substantive reason for the Times—or for anybody—to dismiss the Loch Ness affair as spurious. Late in December 1933, an expedition supported by the Daily Mail found a spoor at the water's edge—which spoor the British Museum identified as originating from a hippopotamus' foot (an umbrella-stand souvenir had been used). And, just a few days later, another hoax involved alleged footprints and the remains of a monstrous meal (Whyte, 1957, pp. 103–107). So hoaxes were an undeniable part of the Loch Ness story from the very beginning of the furor of the 1930s.

At any rate, since January 18, 1934, the London Times has projected a disbelieving and joking attitude in its infrequent editorial comments (May 27, 1938, December 22, 1966, December 3, 1975, August 11, 1978, February 16, 1980). But it has not closed its pages entirely to the opposite view, carrying neutrally worded pieces in 1960 (by Peter Scott, August 14) and 1975 (December 6; interview with Tim **Dinsdale**) about important photographic results at Loch Ness, and an article by a believer in 1968 (October 2, by Elizabeth Montgomery); on the other hand, a very negative article was printed in 1975 (December 27, by Adrian Desmond). On balance, and unchanging over the years, the Times has printed letters without favoring any given viewpoint; though typically the tone of these letters has had some touch of dry **humor**—at the least, the characteristically English tone of not taking too seriously even something one happens to believe quite firmly: see, for example, London Times, December 20, 1933, from Edward Cadogan; December 22, 1933, from J. C. Squire; August 11, 1934, from J. Carter **Rendell**. The tone is also illustrated by the first editorial on the subject, "On the Track of a Monster," December 9, 1933. For examples on a wide variety of subjects, see Gregory (1976).

Although the newspapers displayed long memories for their decisions on how to approach the subject, they evidenced not much memory for specific

details. Now well known among monster buffs and mentioned in all the books beginning with Gould (1934) is the story of St. Columba encountering an aquatic beast at the river Ness about 565 A.D. The *London Times* first drew its readers' attention to that through a letter to the editor printed on December 13, 1933; but published another on May 2, 1934, making the same point as though for the first time; and yet another on August 11, 1934; again on July 7, 1960 (three years after Whyte had written at some length about it in her well-received and reviewed book); on May 12, 1972, an editorial comment said the same thing; and yet again a letter on December 12, 1975. Perhaps this merely illustrates a rather obvious feature of daily newspapers: they do not provide much background on any subject, and reporters rather often fail to consult even obvious works of reference before writing typically short pieces. Thus Berton (1977, p. 29) noted that a French journalist who visited the loch in 1973 to write about the monster remained unaware that any serious books had been published on the subject! And in 1967, the English national dailies had been unaware that the Loch Ness Investigation had existed for five years (Campbell, 1972, p. 74). As commonly said, one ought not to believe everything one reads in the papers; but perhaps especially not about anomalous topics.

For journalists as for others, it is not necessarily easy to locate reliably detailed works on such matters as Loch Ness. On many subjects, quite a good way of getting a rapid and reasonably authoritative synopsis and clues to further reading is to consult an encyclopedia. At least into the mid-1970s, that would not have helped much in the case of the Loch Ness monster. *Collier's Encyclopedia* does not mention it at all. In a number of other encyclopedias, one finds only between a sentence and a paragraph, usually referring only to the "flap" of 1933—in *Britannica* (1970–1973 editions checked), *Chamber's* (1967), *Columbia-Viking* (1968), *International* (1964–1978), *New Caxton* (1977), and *World Book* (1973–1977): rather surprising, perhaps, that the last had no more, since it sponsored work at Loch Ness in the late 1960s. Only the *American* (1973–1980) has a relatively accurate and informative entry (of only four paragraphs, however, with another mention under "Sea-Serpents").

That editorial policy and not events or reported events has been **all-important** in determining the coverage given to Loch Ness is further illustrated by comparing items in the *New York Times*, the regional *Louisville Courier-Journal*, and the local *Lexington Herald-Leader*. Between 1967 and 1975, each of these papers had between half-a-dozen and two dozen pieces that mentioned Loch Ness—but on only one occasion (1975–76) was the same story about Loch Ness featured in all **three** papers, concerning the aborted symposium in Edinburgh (*Times*(New York): May 14, 1967; September 24, 1970; April 25, 1971; January 16, April 2, November 3, 1972; August 18, 1973; February 3, 17, 24, and June 2, 1974; November 23, December 2, 5, 11, 14, 19, 1975; *Courier-Journal*(Louisville): March 12, May 7, 1967; February 4, 1968; October 5, 1969; May 7, 1972; September 16, December 5, 1973; November 10, 23, 24, 27, December 7, 1975; *Herald-Leader*(Lexington,

Kentucky): November 24, 1970; November 3, December 3, 1972; November 23, December 10, 1975; January 1, 1976).

Stories about Loch Ness have been notably inaccurate: Gould (1934, pp. 14, 15, 38, 39, 64, 65, 74, 83, 84) and Whyte (1957, pp. 2, 12, 73, 79) gave details of instances in which the newspaper accounts differed sharply from those provided to the newspapers by the eyewitnesses. At least one photograph was published by a newspaper (Sunday Express, September 7, 1969) as possibly showing the monster even though the paper had been advised by the Loch Ness Investigation (Annual Report, 1969, p. 4n) that the photograph was clearly of the wake from a boat. During 1975 and 1976 in particular, quite inaccurate impressions were conveyed about the credentials of the team from the Academy of Applied Science (Meredith, 1976, 1977).

The lack of consistency, coherence, and depth of background that is characteristic of newspaper coverage means that misleading impressions are conveyed even if only inadvertently through sins of omission rather than of commission. Many newspapers (for example, Louisville (KY) Courier-Journal, July 22, 1977) carried the story of the carcass dredged up in the South Pacific by a Japanese trawler, a carcass that looked most plesiosaur-like; but readers were then left hanging, never learning the results of the tests of tissue samples later carried out. Again, a local paper (Lexington (KY) Herald-Leader, January 29, 1976) carried the news that an improved sonar apparatus had obtained a "sonar photograph" of Nessie; and a couple of days later (February 2) an editorial commented on the chance that Nessie might, after all, be real. Actually that "sonar photo" was a hoax (New Scientist, February 12, 1976, p. 346), but readers of that particular newspaper were never so informed.

The very sparse coverage (Tables 1 and 2) given to Loch Ness by the national newspapers after the furor of 1933–34 no doubt conveyed the impression that sightings had virtually ceased. Westrum (1977, 1979) has pointed out this characteristic feature of anomalies: it is fallacious to conclude that a lack of reports signifies a lack of events, since the making—let alone the publishing—of reports is a function of the social demand for reports of that nature (mediated or interpreted, in the case of newspapers, by editorial policy, availability of other news items, fortuitous simultaneity of reports, for example). In the present instance, we have relevant information from Rupert Gould (1937) that the London press had stopped taking note of Loch Ness despite more than 20 sightings for each of the four years from 1933 to 1936 inclusive.

To summarize the coverage in newspapers before turning to the other literature:

1. The rate of coverage is clearly determined by editorial decision rather than by actual developments; though some events (as in 1938, 1975, 1976, see above) could seem so newsworthy as to overcome the general policy of ignoring Loch Ness.
2. The Scottish regional paper took a stance of reporting rather than judging. The London Times gave more space to letters and comment than to

neutral reporting, and displayed a penchant for dry humor and points made tongue-in-cheek. Both *London* and *New York Times* project disbelief (Table 4, below).

3. No change in attitude over 50 years is evidenced: the *London* and *New York Times* became inclined to jocular disbelief in January 1934, and they continue so; the *Glasgow Herald* continues to report rather than to comment (except that in 1976, when the *New York Times* sponsored an expedition, its coverage was great and uncharacteristically projected belief in the reality of Nessies, see Pollak (1976), Swan (1976), and Table 4).
4. Comparison of the stories covered by three different papers reveals an almost complete lack of agreement as to what is newsworthy: over almost a decade, only one story from Loch Ness was featured by all three.
5. In addition to conveying false impressions as a result of the capricious and sporadic nature of the coverage, newspapers have been guilty of considerable inaccuracy, in reporting what eyewitnesses have said, for example. It follows that readers of newspapers cannot gain an accurate and coherent impression of the events at Loch Ness.

Polarization of Belief

In Table 4 are shown the degrees to which attitudes of belief or disbelief are projected in the different types of writings on the subject. The last column of the table ("average score") indicates that the books, taken as a whole, project quite strong belief; the national newspapers, a tendency to disbelief. Articles in periodicals tend *on the average* to an expression of belief. Perhaps more significant than these averages, however, are the distributions. An average score of neutral (numerically zero) could result from 100% of the sample being neutral, or from 50% strong belief and 50% strong disbelief, or from an infinite number of distributions between those two extremes. The first extreme would correspond to a consensus that the question is open, the other extreme to a completely polarized controversy in which proponents and opponents

TABLE 4
Expressed attitude by type of literature^a

	Strong Belief (+2)	Tending to Belief (+1)	Neutral	Tending to Disbelief (-1)	Strong Disbelief (-2)	Average Score
Books	60%	30%	5%	0%	5%	+1.5
Chapters in Books	45%	10%	20%	15%	15%	+0.6
Articles in Periodicals	35%	10%	25%	10%	20%	+0.3
<i>London Times</i>	0%	30%	25%	25%	20%	-0.3
<i>New York Times</i> , except 1976	0%	30%	20%	30%	15%	-0.3
<i>New York Times</i> , 1976	0%	70%	10%	20%	0%	+0.5

^a Percentages were individually rounded to the nearest 5% to avoid implying too high a degree of validity; sums of the rows may therefore be 95, 100, or 105%.

are equally dogmatic and equally numerous. In the present instance, it appears that there is more polarization of opinion in the periodical literature than in books (which are skewed to belief) or in national newspapers (skewed toward disbelief). A closer examination of the periodical literature reveals other points of interest.

The Loch Ness Monster in Magazines

Thirty-five percent of all articles in magazines have purveyed a strong or utterly decided belief that the Loch Ness monsters are real animals, and another 10% have been inclined to that belief; 20% strongly or utterly of the opinion that it is a matter of myth, hoaxes, mistaken identifications, mirages, and so forth, and another 10% inclined to that view; only 25% of the articles have taken a neutral stance (Table 4). Such polarization of opinion is, of course, only to be expected on a subject that is, by common consent, controversial—no doubt the literature on other anomalies would be similar in that respect. More likely to be idiosyncratic is the actual distribution of belief, and even more so any changes over time in that distribution. (Elsewhere I have suggested (Bauer, 1979, 1987) that the polarization of belief among different groups would be of interest in categorizing controversies. In such socially and politically important technical controversies as those about nuclear power, missile defences, or the environment, I would expect distributions of opinion to be comparable among scientists, the media, and the population as a whole. On the other hand, regarding claimed anomalies of popular interest (Loch Ness, Velikovsky, faith healing, etc.), the distributions would differ drastically between technical experts and the population as a whole.)

In Table 5, attitudes expressed in magazines are shown for six eras, which were chosen after examining projected beliefs year by year and aggregating years over which no significant change was apparent. In the first period, 1933–

TABLE 5
Changes in attitude over time in magazines

Number of Articles per Year	Percentages ^a of Articles Expressing					Average Score	
	Strong Belief (+2)	Tending to Belief (+1)	Neutral (0)	Tending to Disbelief (-1)	Strong Disbelief (-2)		
1933–34	24	25%	10%	20%	10%	35%	-0.2
1935–54	1	15%	5%	45%	5%	30%	-0.3
1955–64	5	40%	10%	20%	10%	20%	+0.4
1965–69	8	30%	30%	30%	0%	10%	+0.6
1970–78	15	45%	10%	20%	20%	10%	+0.6
1979–83	11 ^b	15%	10%	40%	10%	25%	-0.2

^a Individual percentages rounded to nearest 5%; totals may be 95, 100, or 105.

^b 1979–83 included only the first half of 1983; the whole period was taken as 4½ years in calculating this rate.

34, there was much publicity; opinion was quite polarized—and, on the average, inclined to disbelief. During the next 20 years, little was written about Loch Ness; consistent with that, expressed views were more likely to be neutral—the subject was less a matter of controversy and opinion was less polarized. From the mid-1950s to date, the volume of writing has increased. The decade beginning in 1955 saw the weight of opinion shift from slightly disbelieving to slightly believing, but the polarization was as great as in the initial controversy of 1933–34. From 1965 into the late 1970s, strong disbelief was expressed more rarely than strong belief—in 1965–69, there was almost a consensual attitude of belief; in 1970–78, opinion was less consensual but still one of belief and not markedly polarized. Since 1979, the attitude has swung back to skeptical, with an appreciable polarization of strong believers and strong disbelievers.

One can find plausible externalist and internalist rationalizations for these changes. First I shall take an internalist perspective, which is at the same time the perspective of one who believes the Loch Ness phenomenon to be that of the existence of unidentified animals. Comments from an externalist perspective, which is at the same time that of a skeptic, follow in a separate section of this paper.

For about 20 years after the flap of 1933–34, there was no organized search for Nessie and little was written about the matter: naturally, then, opinion became less polarized but with no appreciable change in the average weight of opinion. But events were setting the stage for a surge of belief: sightings continued (Table 1) and slowly the accumulating evidence convinced more of the local population; for example, that prominent citizens admitted at a meeting of the Inverness County Council in 1947 that they had seen the monster will have carried some considerable conviction (**Herries**, 1947). Moreover, documentation of the evidence became satisfactory for the first time in the 1950s (apart from Gould's pioneering effort in 1933–34) as a result of Constance **Whyte's** work and writing: in 1951, Maurice Burton brought to public attention a pamphlet by **Whyte** published in Inverness, and in 1957 **Whyte's** full book appeared. That book provided historical perspective, many eyewitness reports, important photography, and a most judicious discussion of the improbabilities of the whole matter. It sparked new interest: the Loch Ness Phenomena Investigation Bureau was established in the early 1960s and it organized searches at the loch during the next 10 years; beginning in 1970, annual expeditions were mounted by the Academy of Applied Science (based initially in Massachusetts, latterly in New Hampshire). New evidence for the reality of **Nessies** came from sonar experiments; from **Dinsdale's** movie obtained in 1960 and the Royal Air Force examination of that film in 1965; from underwater photographs made by the Academy in 1972 and 1975 (for details of all those matters, see Mackal (1976) and **Witchell** (1974)). So the attitude of belief that emerged in the 1950s and grew stronger through the next two decades reflected accumulating evidence from publicly visible and successful research at Loch Ness. But no new results of importance have come

TABLE 6
Changes in attitude in British and in American magazines

Number of Articles per Year	Percentages of Articles Expressing					Average Score	
	Strong Belief (+2)	Tending to Belief (+1)	Neutral (0)	Tending to Disbelief (-1)	Strong Disbelief (-2)		
British							
1933-34	19	30%	10%	20%	10%	30%	< -0.1
1935-54	0.7	25%	10%	45%	10%	15%	+0.2
1955-64	3	40%	15%	10%	10%	30%	+0.3
1965-69	2	30%	10%	10%	0%	50%	-0.3
1970-78	5	45%	10%	20%	20%	10%	+0.7
1979-83	4	15%	5%	40%	0%	35%	-0.4
American							
1933-34	5	10%	0%	20%	20%	50%	-1.0
1935-54	0.4	0%	0%	40%	0%	60%	-1.1
1955-64	2	45%	0%	40%	5%	15%	+0.5
1965-69	6	30%	35%	35%	5%	0%	+0.9
1970-78	9	45%	10%	20%	15%	10%	+0.6
1979-83	7	15%	10%	40%	15%	20%	-0.1

in since 1975; hence the weakening of belief over the last few years, with a distribution of attitudes quite similar to that of the earlier "quiet" years, 1935-54.

This analysis can be sharpened by looking separately at magazines published in Britain and in the U.S.A. (Table 6): the overall change from somewhat disbelieving initially, to somewhat believing from the mid-1950s to the late 1970s, and back to disbelief in recent years remains valid, but can be explained in more detail.

Note first that the literature was predominantly British in the first two periods of time but has been predominantly American since the 1960s; as already indicated in Table 1, 80% of articles about Loch Ness were published in British magazines in the 1930s and 1940s, but from the mid-1960s the proportion has been only between 25 and 40%. Second, expressed attitudes have been stronger in American than in British publications. The American articles were strongly negative up to the mid-1950s, whereas the British ones were mildly positive on the average; the American range of opinion was skewed to disbelief, whereas the British distribution was very polarized between proponents and opponents and neutral observers. That seems natural for a phenomenon geographically located in Britain, generating more controversy and writing there than across the Atlantic, where it could readily be dismissed as just another sea-serpent flap.

During 1955 to 1964, the American and British literatures were much more similar, but there was a big difference in the late 1960s. In Britain, the Loch Ness Investigation was at work, but was not given much publicity

(Campbell, 1972, p. 74); at the same time in America, Roy Mackal was enlisting moral and financial support from the Adventurers Club of Chicago, the Explorers Club, and notably from Field Enterprises of Chicago, proprietors of newspapers and of World Book Encyclopedia—and Field Enterprises used its public-relations apparatus to generate much favorable publicity. So British periodicals expressed a predominantly skeptical attitude, sharply polarized between proponents and opponents, whereas American publications were virtually consensual, strongly skewed toward belief.

Since 1970, the literatures have again been quite similar. The important work has been done by the Academy of Applied Science, covered heavily in the U.S.A. because it is based there. So more is published in American than in British periodicals, but what is written shows no significant differences.

The literature can also be subdivided other than geographically: for example, by the nature of the magazine—scientific or general-interest; and for each such division, one might look for changes in attitude over time. A rigorously multivariate analysis does not seem appropriate, however, for a sample of the present size, the number of variables of potential interest, and the very simple method of coding used. Consequently some other aspects of the literature are examined in the following only for major possible correlations, with the sample subdivided in each case only by the variables among which correlations were sought. Consequently also, interpretations will focus only on obviously significant differences.

The periodicals were classified by categories between which significant differences would be expected: scientific (e.g., *Nature*, *Science*, *Limnology and Oceanography*); popular science (e.g., *Wildlife*, *National Geographic*, *Popular Mechanics*, *New Scientist*); general interest (e.g., *Time*, *Harper's*, *Field*, *Maclean's*); specialist (e.g., *Skin Diver*, *Elks Magazine*, *University of Chicago Magazine*); and specializing in anomalies (e.g., *Fate*, *Flying Saucer Review*, *Fortean Times*). The composition of the literature in these terms is shown in Table 7. Most worth noting, perhaps, is that only one quarter of the literature represents periodicals specializing in anomalies: the literature is predominantly in very respectable publications. Moreover, that was particularly the case dur-

TABLE 7
Proportion of articles in periodicals of different sorts
(percentages, rounded to nearest five percent)

	General Interest	Popular Science	Scientific	Specialist	Specializing in Anomalies	(Total Number of Articles)
1933-34	75	5	10	10	0	(47)
1935-54	55	5	0	5	35	(20)
1955-64	45	30	0	5	20	(54)
1965-69	15	20	10	15	45	(40)
1970-78	25	15	15	20	25	(134)
1979-83	15	50	5	15	20	(51)
Overall	35	20	10	15	25	(346)

TABLE 8
Attitudes projected in different sorts of periodical

	Percentages of Articles Expressing						Average Score
	(Total Numbers of Articles)	Strong Belief (+2)	Tending to Belief (-1)	Neutral (0)	Tending to Disbelief (-1)	Strong Disbelief (-2)	
Specializing in anomalies	(79)	40%	10%	35%	15%	5%	+0.7
Specialist	(48)	40%	10%	25%	5%	20%	+0.4
General interest	(115)	35%	15%	25%	10%	20%	+0.3
Popular science	(73)	30%	5%	20%	10%	30%	-0.1
Science	(30)	15%	20%	30%	10%	25%	0.0

ing the initial controversy in 1933-34. In the "quiet" years 1935-54, a larger proportion of the writing was in anomalistic journals, but still it was largely general-interest magazines that kept the matter in public view. Since the mid-1960s, coverage in journals of science and of popular science has equalled or exceeded that in periodicals of anomalies. This is more what one would expect of a topic of substantive scientific or technological interest than of such a typical pseudo-science as astrology, for example. Unfortunately, similar analyses of other subjects are not available, however.

Examination of the expressed attitude by type of periodical shows what one might expect (Table 8): the strongest degree of belief in periodicals concentrating on anomalous claims and phenomena, weakest belief in journals of science and popular science. The degree of polarization of expressed opinion seems not to differ very much between these categories, however; and indeed the variation of average expressed belief is less than one would find with many anomalous or occult subjects, where magazines specializing in anomalies would score at least as high in belief, but scientific journals—if they mentioned the subjects at all—would be strongly negative.

The analysis revealed no great differences among these types of periodicals in the degree of jocularity, as opposed to seriousness, with which the subject has been treated: about one article in five indulged in humor to some degree. Nor was there any marked difference in reliability: one article in four contains errors varying from minor to gross. There is a difference, however, in the proportion of lengthy articles in the various classes of journals: articles of more than two pages represented about two thirds of all the writing in the specialist periodicals, only one third to one quarter of those in general-interest and popular-science magazines, and only about one sixth of those in scientific journals. Those differences are hardly an occasion for surprise, however. A possible interpretation is that the author and type of article is more significant than the publication in which it appears. One who takes such a subject as Nessie seriously and treats it objectively may not be able to get published in a journal of science and may eventually turn to the periodicals specializing

TABLE 9
Disbelief and jocularity

	Completely Serious (0)	Slightly Jocular (0.5)	Jocular (1)	Utterly Jocular (2)	(Numbers of Articles)	Average Score on Jocularity
Strong belief	96%	2%	1%	1%	(116)	0.03
Leaning to belief	91%	6%	3%	0%	(36)	0.06
Neutral	81%	12%	6%	1%	(90)	0.14
Leaning to disbelief	48%	48%	4%	0%	(40)	0.29
Strong disbelief	63%	8%	19%	10%	(63)	0.42

in anomalies. The latter magazines, whose general level of reliability is not high, nevertheless publish a proportion of quite reliable, even well-documented pieces.

The tendency to jocularity was most marked in the most disbelieving writings; and positive belief was expressed more frequently in the longer articles than in the shorter ones (Tables 9, 10). (Though the "average" degree of jocularity increased as belief changed to disbelief, more of the strongly negative pieces were completely serious than were the tentatively negative ones. Perhaps this reflects the typical humorlessness of the strident disbeliever.)

Perhaps less to be expected was the greater frequency of clear errors of fact in the articles that expressed the most negative view of the Loch Ness phenomenon (Table 11). Writings by the believers are remarkably free of gross errors, though 20% have minor mistakes about such things as dates, type of photographic apparatus, and so forth. Neutrally written articles are about equally reliable; but about one third of the "debunking" articles contain quite serious errors on points of some importance.

Two possible explanations come readily to mind. From the viewpoint of a believer, the obvious explanation is that the debunkers are not familiar with the evidence—if they were, they would not remain disbelievers! That argument is consistent with the few data available about the distribution of belief among

TABLE 10
Length of article and attitude

	Strong Belief (+2)	Tend to Belief (+1)	Neutral (0)	Tend to Disbelief (-1)	Strong Disbelief (-2)	(Number of Articles)	Average Score
One paragraph or less Between one paragraph and two pages	10%	5%	55%	15%	15%	(33)	-0.3
More than two pages	25%	15%	25%	15%	25%	(220)	0.0
	65%	10%	15%	5%	10%	(92)	1.1

TABLE 11
Correlation between expressed disbelief and errors of fact

Expressed Attitude	Percentages of Articles With				(Numbers of Articles)
	No Significant Errors	Minor Errors	Definite Errors	Totally Erroneous Presentation	
Strong belief	77%	20%	2%	1%	(116)
Inclined to belief	78%	14%	—	8%	(36)
Neutral	88%	2%	6%	4%	(90)
Inclined to disbelief	69%	15%	13%	3%	(40)
Strong or utter disbelief	55%	16%	19%	10%	(63)

various groups. The population as a whole has learned about Loch Ness primarily from the newspapers, which have never presented a coherent or fully documented account, and only some 13% of Americans have come to believe in the reality of Nessies; on the other hand, nearly 40% of marine biologists give credence to the evidence that Nessies are real, presumably through reading some of the available books and articles in reputable periodicals (Greenwell, 1980; Greenwell & King, 1980). A second possible explanation, not mutually exclusive with the first, is that the debunkers are simply careless with the facts—because they regard their case as so self-evidently overwhelming, for example; there is clear evidence in the literature about anomalies that some debunkers do adopt that stance. For example, in the Velikovsky affair (Bauer, 1984), the astronomer **McLaughlin** admitted that he had not read Velikovsky's book (Juergens, 1966); other astronomers were very careless in argumentation (Knight, 1970, p. 136); some critics said that it was not worth the time and effort to make a fully reasoned response (Gardner, 1950; Lafleur, 1951; Payne-Gaposchkin, 1952). Another example concerns arguments over statistical data relating to planetary positions: members of the Committee for the Scientific Investigation of Claims of the Paranormal behaved most unethically as well as carelessly—falsifying results and attempting to cover up errors (Rawlins, 1981; *Skeptical Inquirer*, Winter 1981–82, vol. VI, no. 2, pp. 58–67).

Externalist Considerations

The change from projected disbelief that began in the 1950s is consistent with Whyte's publishing in 1957 of an excellent book written from a believer's perspective, and the subsequent events as outlined above. But it may also be that this change in belief resulted at least in part from some general openness on the part of society to recondite or unorthodox possibilities. Martin Gardner's collection of what he termed modern pseudo-science was published in 1952; and several of those subjects were particularly public matters during the 1950s—UFOs, dianetics, Bridey Murphy, Velikovsky, Lysenko. And it

was in 1951 that **Shipton** photographed the spoor of a supposed yeti, and three years later that the *Daily Mail* organized an expedition to search the Himalayas for these creatures (Sanderson, 1977, pp. 54–55). The Loch Ness monster was by no means unique among anomalies in attaining a measure of respectability in the 1950s (Bauer, 1986–87; Dutch, 1986).

Conclusions: The Literature and the Public Image

Books on the subject overwhelmingly treat Nessies as real. Magazine articles have been preponderantly positive for much of the last 25 years. But for the newspapers, Nessie remains a compound of myth, hoax, gullibility—and that has not changed over five decades. The public image corresponds to the last view. Somewhat similar conclusions emerged from a study of the literature dealing with UFOs (Strentz, 1970): newspapers were a more common source of information than were magazines, by a factor of 2.5; coverage was of "breaking" stories, and lacked depth and background; local papers gave relatively continuous coverage whereas national papers were sporadic in their attention.

It is understandable, of course, that newspapers are more influential persuaders of the public than are magazines or books. The papers are published daily, and reach a very large proportion of the population; the sum of the circulations of all daily papers exceeds by an order of magnitude even those of such magazines as *Reader's Digest* and *Time*, which have circulations in the millions (but appear only once a week or once a month). The numbers of books sold is miniscule in comparison. I asked the publishers for all books (Bauer, 1980, 1982) specifically dealing with Nessie for information about sales: for those two dozen volumes, the *total* of sales over the years has been between a quarter and half a million copies. Of course, each copy of a book has more than one reader; but it is not unreasonable to guess that the number of people who have read even one book about Nessie is comparable to the number of people who read a *single issue* of *Reader's Digest*. It is not irrelevant here to recall that three out of every five American adults have never read completely a book other than a textbook or the Bible (Gallup poll no. 47, May 1969).

Perhaps a little more surprising is the finding that the newspapers have hardly altered their editorial stances over 50 years, during which time there has been a marked shift of opinion expressed in serious writings on the subject in respectable journals. Yet that too is understandable. Newspapers are primarily concerned with current events; reporters have little time for research on the background of a story; and since there are no established experts or authorities on such matters as Nessie, the attempt by a reporter to set the matter in context could easily come to nought (see above concerning encyclopedias; and Berton (1977, p. 297) and Campbell (1972, p. 74)). By contrast, in recognized scientific specialities, reporters have access to authoritative information by making contact with publicly established experts whose **knowledge remains up-to-date**.

The nature of the literature about the Loch Ness monster is at variance with the public image which associates it with pseudo-science. Almost all the books on the subject come from reputable publishers, in contrast to the frequent appearance of obvious pseudo-science as self-publication or from houses established solely to publish about that particular claim or phenomenon (thus **Kronos Press** for Velikovskians; **Pacific Meridian Publishing Company** for Pattenist catastrophists, for instance). Articles about Nessie have appeared chiefly in the well-established **general** periodicals as well as in journals of science and of popular science; less than one quarter of the articles is in *Fortean Times*, *Fate*, *INFO*, *Pursuit*, and the like. In contrast, pseudo-science appears more in the latter and in journals established by followers of the particular cult, less frequently in the reputable general-interest periodicals, and hardly at all in journals of science. (But note that, as earlier mentioned, some reliable articles appear in some of the fringe periodicals; and they are also an irreplaceable source of information about anomalies.)

Not only is the nature of the literature about Loch Ness thus at variance with the public image, but its content is also: in that errors are much more common in the writings that deny than in those that affirm the evidence; and in that the evidence is given considerable credence by 40% of marine biologists, experts whose field is directly relevant (Greenwell & King, 1980). The present status of the matter makes it not only an interesting example of anomalies, but also one that can illuminate the problem of identifying demarcation criteria for what may be classed as science and what as pseudo-science.

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