

## Lloyd Morgan's Canon: A History of Its Misrepresentation

© Roger K. Thomas 2001

This article was published in 2001 in *History and Theory in Psychology Eprint Archive* maintained at York University, Canada. Apparently, that Archive is now defunct. The article's structure then was designed to be web-user friendly. This version has been re-structured to be print-user friendly. Some improvements in writing style have been made, but the original content, except for the box on p. 13 remains unchanged. Please see Author Note on p. 17.

Roger K. Thomas, Ph.D.  
The University of Georgia

*In no case may we interpret an action as the outcome of the exercise of a higher psychological faculty, if it can be interpreted as the outcome of the exercise of one which stands lower in the psychological scale.* (Morgan, 1894, p.53)

“Perhaps, the most quoted statement in the history of comparative psychology is Lloyd Morgan’s canon.” (Dewsbury, 1984, p. 187). “To this it can be added that perhaps the most *misrepresented* statement in the history of comparative psychology is Lloyd Morgan’s canon.” (Thomas, 1998, p. 156)

The most frequently cited source for Morgan’s canon has been Conwy Lloyd Morgan’s (1852-1936) *An Introduction to Comparative Psychology* (1894). However, the canon appears to have been published first in Dixon’s synopsis of Morgan’s paper, “The Limits of Animal Intelligence,” presented at the 1892 meeting of the International Congress of Experimental Psychology (Dixon, 1892; Dixon referred to it as a “rule” and noted that any quotations were from a written *précis* distributed by Morgan at the meeting).

Misrepresentations of Morgan’s canon such as associating it with the law of parsimony began at least as early as Stanley’s (1896) review of *An Introduction to Comparative Psychology* and has continued, at least, through Dewsbury (2000), Goodwin (1999), and Schultz and Schultz (2000). Comparing Morgan’s canon to the law of parsimony has been, perhaps, the most frequent and persistent form of misrepresentation (see Appendix 1, pp. 24-28) and Table 2, p. 12).

Although Adams (1928) was among those who erroneously believed that Morgan intended that his principle be a canon of parsimony, Adams was also among the first to show that Morgan’s canon and parsimony are “...not related...and may on occasion work to exactly opposite effect.” (p. 242) Several writers (e.g., Burghardt, 1984; Costall, 1993, 1998; Costall, Clark, & Wozniak, 1997; Gray, 1963a, Miller, 1962; Nagge, 1932; Newbury, 1954; Singer, 1991, Thomas, 1998, and Wozniak, 1993) have tried to correct the association of Morgan’s canon with the law of parsimony as well as other misrepresentations that will be considered below. Table 1 presents side by side chronologies of (a) sources that have misrepresented Morgan’s canon and (b) sources that have

Table 1: Examples in Chronological Order SEPARATED by Decade to Illustrate the History of Misrepresentations of Morgan's Canon and Efforts to Correct the Misrepresentations.

Misrepresentations of Morgan's Canon	Efforts to Correct Misrepresentations
Stanley, 1896 Mills, 1899	
Washburn, 1908	
Holmes, 1911	
Warden, 1927 Adams, 1928 Boring, 1929 Pillsbury, 1929	Adams, 1928 Boring, 1929
Flugel, 1933 Waters, 1939	Nagge, 1932
Harriman, 1947	
Munn, 1950	Newbury, 1954
Caldwell, 1960	Miller, 1962 Gray, 1963a
Dewsbury, 1973 Dewsbury, 1978	
Denny, 1980 Griffin, 1981 Boakes, 1984 Dewsbury, 1984 Epstein, 1984	Singer, 1981
Grier & Burke, 1992 Baenninger, 1994 Barrow, 1995 Bekoff & Allen, 1997 Knoll, 1997 Macphail, 1998 See, also, Table 4	Costall 1993 Wozniak, 1993 Costall et al., 1997 Costall, 1998 Thomas, 1998
Dewsbury, 2000 See, also, Table 4	

tried to correct the misrepresentation of Morgan's canon. Quotations from each of the sources cited in Table 1 may be seen in Appendix 1 where the misrepresentations are shown, Appendix 2 (PP. 29-32) provides quotations from those who tried to correct the misrepresentations..

The enduring misrepresentation of Morgan's canon provoked Costall (1998) to write, "The extent to which the intention of Morgan's canon has been misinterpreted is astonishing." (p. 18). Wozniak (1993) wrote,, "It would be an interesting study in itself to trace the progressive distortion of Morgan's views and in particular the attribution to Morgan of the principle of parsimony." (p. x) The present work likely will not be the study Wozniak envisioned, but it will contribute to better understanding of the history of misrepresentation of Morgan's canon.

### How Has Morgan's Canon Been Misrepresented?

Morgan's canon has typically been misrepresented in one or more of following ways: (a) one should prefer the simplest interpretation of behavioral observations or data when two or more alternative explanations are being considered, (b) the canon has often been misrepresented as psychology's version of Ockham's or "Occam's razor" and (c) the "law of parsimony. Further the canon has been misrepresented as being (d) anti-anthropomorphic and (e) anti-anecdotal. An additional misrepresentation that overlaps the five already listed is that Morgan's canon was formulated in reaction to the works of George John Romanes (1848-1894) especially Romanes (1882, but also 1883, 1887). The first two misrepresentations, parsimony and anti-anthropomorphism, have occurred more frequently, and the emphasis in the present paper will be on them. However, consideration will be given to other misrepresentations as well..

### What Morgan Intended by the Canon

It may be useful to note that Morgan did not call his statement a canon at the time that he first stated it, rather he referred to it as a "basal principle" and, as noted earlier, Dixon (1892) referred to it as a "rule." Later, Morgan (1900, p. 270) did refer to it as a "canon of interpretation." I have not determined whether Morgan was the first to use "canon" in this context. Since it is best known as Morgan's canon, rather than Morgan's principle, unless referring to Morgan's own references to it as a "principle," it will be identified hereafter as Morgan's canon.

In *An Introduction to Comparative Psychology*, Morgan (1894) addressed several *principles* that should guide one's study of comparative psychology. Near the end of chapter III titled "Other Minds Than Ours," he wrote:

There is one basal principle, however, the brief exposition of which may fitly bring to a close this chapter. It maybe thus stated:--*In no case may we interpret an action as the outcome of the exercise of a higher psychological faculty, if it can be interpreted as the outcome of the exercise of one which stands lower in the psychological scale.* (Morgan, 1894, p.53)

The remainder of his chapter III (viz., pp. 53-59) was devoted to explaining this basal principle, i.e., Morgan's canon. Although he retained the exact wording in the italicized version of the canon on page 53 in the 1903 Revised Edition, Morgan added a paragraph on page 59 where he offered a substitute version for those who found the phrase "psychical faculty" to be "too reminiscent of a faculty psychology." This revised version was interesting also for the additional modification which changed "psychological scale" to "scale of psychological evolution and development." These changes indicate that Morgan was already struggling with misinterpretations of the canon. The modified canon was:

In no case is an animal activity to be interpreted in terms of higher psychological processes, if it can be fairly interpreted in terms of processes which stand lower in the scale of psychological evolution and development. (Morgan, 1903, p. 59)

As Morgan made clear in the revised version of the canon quoted above, the higher and lower psychological processes referred to a psychological scale presumed to result from psychological evolution and development. A difficulty long-associated with Morgan's canon is that he did not provide a psychological scale *per se*, although one may be inferred from his chapter headings, their order of appearance within the book, and his discussion of the topics of those chapter headings. See Burghardt (1984) for additional discussion of the addendum to the 1903 revision of the canon as well as other useful information not provided here.

### Morgan's View of Simplicity as a Criterion

As noted above, the most persistent misrepresentation of Morgan's canon has been that lower and higher processes are related to some kind of simplicity criterion for choosing among alternative explanations such as that embodied in Ockham's razor or the law of parsimony. Burghardt (1984) and others who provided critiques of Morgan's canon, emphasized that Morgan dismissed the utility of a simplicity criterion. In view of this persistent misinterpretation, it is especially noteworthy that Morgan thought that an objection that might be offered to his principle was that it might 'shut out' the "simplest explanation," not that it might foster a preference for the simplest explanation!

Immediately following his presentation of the canon on page 53, Morgan (1894) began to anticipate and address some of the objections that might be raised against it. Regarding simplicity as a criterion, on page 54 Morgan wrote a lengthy paragraph that is worth quoting in full.

A second objection is, that by adopting the principle in question, we may be shutting our eyes to the simplest explanation of the phenomena. Is it not simpler to explain the higher activities of animals as the direct outcome of reason or intellectual thought, than to explain them as the complex results of mere intelligence or practical sense experience? Undoubtedly, it may in many cases seem simpler. It is the apparent simplicity of the explanation that leads many people to naively adopt it. But surely the simplicity of an explanation is no

necessary criterion of its truth. The explanation of the genesis of the organic world by direct creative fiat, is far simpler than the explanation of the genesis through the indirect method of evolution. The explanation of instinct and early phases of intelligence as due to inherited habit, individually acquired, is undoubtedly simpler than the explanation that Dr. Weismann would substitute for it. The formation of the [canyon] of the Colorado by a sudden rift in the earth's crust, similar to those which opened during the Calabrian earthquakes, is simpler than its formation by the fretting of the stream during long ages under varying meteorological conditions. In these cases and in many others the simplest explanation is not the one accepted by science. Moreover, the simplicity of the explanation of the phenomena of animal activity as the result of intellectual processes, can only be adopted on the assumption of a correlative complexity in the mental nature of the animal as agent. And to assume this complexity of mental nature on grounds other than those of sound induction, is to depart from the methods of scientific procedure. [paragraph break] But what, it may be asked, is the logical basis upon which this principle is founded? (Morgan, 1894, pp. 54-55)

Obviously, the “logical basis upon which this principle is founded,” was not on the basis of a simplicity criterion. Morgan showed in the preceding quotation that simplicity could be an untrustworthy and misleading criterion for choosing among alternative explanations. It is no wonder that Wozniak (1993), who criticized some of those who had misrepresented Morgan's canon, wrote, “Even if one set out deliberately to distort the meaning of Morgan's canon, it would be virtually impossible to do so with greater success. Morgan's canon is not a principle of parsimony....” (p. ix-x)

Some of the history of the law or principle of parsimony will be addressed below, but it may be of some interest at this point to note that the *Oxford English Dictionary* cited Sir William Hamilton as providing the first documented use of the phrase, “law of parsimony” (see more on Hamilton below). Morgan's *Animal Life and Intelligence* (1890) was cited as the third documented use of the phrase, “law of parsimony.”

Regarding Morgan's reference to the “law of parsimony,” his opinion was, “We do not know enough about the causes of variation to be rigidly bound by the law of parcimony.” (Morgan, 1890, p. 174). Hamilton and Morgan spelled it “parcimony.” “Parcimony” appears in the index of *Animal life and Intelligence* (1890), but neither it, “Ockham's razor,” nor “parsimony” appeared in the indexes of Morgan's *An Introduction to Comparative Psychology* (1894) or *Animal Behaviour* (1900). It may be pertinent to note that *Animal Behaviour* began as a revision of *Animal life and Intelligence*, but when “...it appeared that the amended treatment would not fall conveniently under the previous scheme of arrangement. I, therefore, decided to write a new book....” (Morgan, 1900, Preface)

## Morgan's Canon and Anthropomorphism

The second most frequent misrepresentation of Morgan's canon is that it was anti-anthropomorphic. According to Morgan (1894, p. 55), "As we have already seen, we are forced, as men, to gauge the psychical level of the animal in terms of the only mind of which we have first hand knowledge, namely the human mind. But how are we to apply the gauge?" Morgan explained how to apply the gauge on pages 56-59, and it clearly involves anthropomorphic reasoning by analogy; see also, Costall (1993, 1998, and selected quotations in Appendix 2). Burghardt (1984, pp. 911-913) provided a useful account of how Morgan proposed that humans must use introspection to study animal minds. Wozniak (1993), who was quoted above on the point of misrepresentation of the canon by association with parsimony, also addressed those who misrepresented it as being anti-anthropomorphic. He said, "Even worse, it [Morgan's canon] is consciously anthropomorphic and based squarely on the adequacy of the psychologist's personal introspection." (Wozniak, 1993, pp. ix-x)

## Occam's Razor, the Law of Parsimony, and Simplicity

Because the most frequent misrepresentations of Morgan's canon are linked it being animal psychology's closely related if not equivalent version of Occam's razor and the law of parsimony, it will be useful to review briefly the origin and intent of Occam's razor and the law of parsimony. Additionally, because Morgan's canon has continued to be represented as manifesting a simplicity criterion for choosing among alternative explanations regarding animal behavior (e.g., Dewsbury, 2000; see quotation in Appendix 1), whether or not Occam's razor or the law of parsimony were invoked, it may be useful to address briefly some contemporary views regarding simplicity criteria *per se* in the sciences.

### Occam's Razor

Scholars who specialize in William Ockham (c.1285-1349) tend to spell his surname "Ockham" (e.g., Adams, 1987; Buytaert, 1958; Maurer, 1999; Moody, 1967). However, the *Oxford English Dictionary* uses "Occam" as the preferred spelling, and most contemporary writers seem to prefer Occam. Ockham will be used here except when someone is being quoted who used Occam.

William of Ockham has been described as "...the most influential philosopher of the fourteenth century..." (Moody, 1967, p. 306). Ockham's razor was a methodological stricture for choosing among alternative logical formulations. While the most quoted version of Occam's razor appears to be, *Entia non sunt multiplicanda praeter necessitatem*, (entities are not to be multiplied without necessity; Moody's translation) apparently, this version has not been found to be among Ockham's writings (Burns, 1915; Moody, 1967; Thornburn, 1915). However, several apparently equivalent or closely comparable statements attributed to Ockham are known (see Adams, 1987 for several documented versions of Ockham's razor). To cite two examples as translated by Moody (1967), "Plurality is not to be assumed without necessity" and "What can be done with

fewer [assumptions] is done in vain with more.” (p.307). For more on Ockham’s razor and its predecessors, see Adams (1987), Burns (1915), Buytaert (1958), Thornburn (1915), and Maurer (1999).

Ockham scholars do not always agree regarding the applicability of Ockham’s razor. For example, in the context of commenting on the apparent lack of occurrence in Ockham’s writings of *entia non sunt multiplicanda necessitatem*, Burns (1915) wrote:

The force of Ockham’s objection against Scotus was that logic and metaphysics were distinct. Both the thing and the universal are “entia,” one “in re” and the other “in mente”. Only a Scotist could think that the law of parcimony had anything to do with “entia.” This is perhaps a mere matter of words; but words to a man like Ockham were not unimportant, and he was very careful with his original razor to make it cut only hypotheses (ponere, etc.). As a hit at a Scotist, he might have said “You must not make so many realities”; but in his philosophical argument he never seems to have forgotten that “entia” are quite untouched by logic.

However, Adams (1987) cited four versions of Ockham’s razor (identified as “D” through “G.” including two that were similar to those translated by Moody above (1967). Adams concluded:

They are in the first instance, methodological principles, and it is not obvious how they are related to truth or even to probability. As such, they could serve as the basis of pragmatic arguments about what it would be futile or superfluous to do, or what one ought to do, but not of demonstrations in speculative metaphysics about what entities really exist. In this, (D) - (G) contrast with

(H) No plurality exists which cannot be proved from reason, experience or infallible authority,

and

(J) God never does with more what He could do with fewer.

Which could serve as premises in valid deductive arguments concerning what entities really exist. (p. 158).

Finally, for present purposes, Maurer (1999) wrote:

We can be certain that he [Ockham] regarded the razor as a principle, not in demonstrative but in dialectical reasoning, and as such it plays a significant role in shaping his views on reality and the mind. (p. 129)

Lest one read too much into the latter clause, a careful reading of Maurer (pp. 112-129) is recommended.

Maurer (1999) also noted that Walter Chatton, a contemporary critic of Ockham, proposed an anti-razor, “My rule...if three things are not enough to verify an affirmative proposition about things, a fourth must be added, and so on.” (Maurer, 1999, p. 127, and see Boring, 1929 and 1950 in Appendix 2). Maurer also recounted some of the debate between Chatton and Ockham concerning the razor. In any case, whether or not Ockham’s razor might be applied appropriately to the kinds of natural phenomena that Morgan’s canon addressed, Hamilton (see next section) made it clear that his “law of parsimony” was intended to address natural phenomena.

### Law of Parsimony

Ockham’s razor was equated to the “Law of Parsimony” in the *Oxford English Dictionary* (Simpson & Weiner, 1989, Volume XIII, p. 245). However, the “law of parsimony” appears to be most associated with Sir William Hamilton (1788-1856). Hamilton has been recognized for extending the applicability of Ockham’s razor to explanations associated with natural phenomena. According to Pearson (1892), Sir William Hamilton “. . . in a valuable historical note. . .” extended Occam’s razor as follows. First, Hamilton extended it with some “further scholastic axioms” (see Pearson, p. 482). Pearson assessed the result of that extension as: “So far these axioms are valuable as canons of thought, they express no dogma but a fundamental principle of the economy of thought.” (p. 482). Pearson continued:

When, however, Sir William Hamilton adds to them, *Natura horret superfluum*, and says that they only embody Aristotle and Newton’s dicta that God and Nature never operate superfluously and always through one rather than a plurality of causes, then it seems to me we are passing from the safe field of scientific thought to a region thickly strewn with the pitfalls of metaphysical dogma. (p. 482)

After addressing some of the pitfalls, Pearson continued:

Sir William Hamilton expresses Occam’s canon in the more complete and adequate form: - *Neither more, nor more onerous causes are to be assumed than are necessary to account for the phenomena.* (p. 482)

Pearson cited Hamilton’s “Discussions on Philosophy, 2<sup>nd</sup> edition, pp. 628-31, London, 1853,” which was not readily available to the present writer. However, Hamilton can be quoted directly on the “law of parsimony” from available sources as follows:

Without descending to details...there exists a primary presumption of philosophy. This is the law of parsimony; which prohibits, without a proven necessity, the multiplication of entities, powers, principles or causes; above all, the postulation of an unknown force where a known impotence can account for the phenomenon.

We are therefore entitled to apply “Occam’s razor” to this theory of causality, unless it be proved possible to explain the causal judgment at a cheaper rate...” (Hamilton, 1855, p. 580; a slightly, differently worded version of the quotation may be seen in Hamilton, 1869, Volume 1, p. 586.]

### Simplicity and Choosing Among Alternative Explanations in Contemporary Science

The ability and desirability to choose among alternative explanations in science, including behavioral science, based on choosing the simpler or simplest explanation appears to be taken for granted by most psychologists who invoke the criterion. However, philosophers of science who have considered the simplicity criterion have raised serious doubts regarding its feasibility in most circumstances. For example, see Bunge’s (1963), *Myth of simplicity: Problems of scientific philosophy*, or for more recent accounts, see several authors (by referring to “simplicity” in the index) included in Boyd, Gaspar, and Trout (1991).

While this is not the place, nor am I prepared to summarize all the important considerations associated with the general impracticality or fallibility of a simplicity criterion, an important consideration that is likely to be applicable to any attempt to apply a simplicity criterion to the kinds of explanations addressed by Morgan’s canon is the fallibility of the words in which explanations are expressed or the fallibility of understanding all that may be applicable to each potential explanation. For example, a seemingly simpler explanation that may seem to embody one or only a few assumptions may embody many hidden or unrealized assumptions. This may have been part of what Morgan was trying to demonstrate with his examples quoted earlier to show his misgivings about simplicity as a criterion. Consider Morgan’s example regarding the formation of the Colorado canyon, where formation by earthquake was offered as a “simpler” explanation compared to the “...fretting of the stream during long periods of varying meteorological conditions” (Morgan, 1894, p. 54). According to Morgan, earthquake as a cause for the canyon was the simpler but not the scientifically accepted explanation. Nevertheless, that seemingly simpler earthquake explanation, in light of modern knowledge, overlooks the complex chain of geological events that likely also occurred “during long periods” that result in an earthquake.

Please see, also, a brief and equally skeptical, discussion of the simplicity criterion as it might be applied to research in animal cognition and, thus, Morgan’s canon, in Thomas (1998). Finally, on the point of simplicity as a criterion for choosing among scientific explanations, in his recently published *Dictionary of Philosophy*, Bunge (1999) defined “simplism” as:

The view that the simplest hypotheses, theories, or methods are always to be preferred. Given the complexity of the real world, the only justification for simplism is laziness. Indeed the history of knowledge is, on the whole, one of increasing complexity.

## A History of Misrepresentations of Morgan's Canon and Efforts to Correct

With the preceding sections of this paper as background, central to this section are Appendix 1 and Appendix 2. Appendix 1 provides quotations selected to be illustrative of the history of the misrepresentation of Morgan's canon. Appendix 2 provides quotations selected to be illustrative of the history of attempts to correct some of the misrepresentations. Rather than try to include all pertinent references (a task likely to be near-impossible, especially for Table 2), the sources used were selected, either by convenience (e.g., articles and books I had already collected over the years) or in pursuit of answers to specific questions. It is highly likely that many more examples of misrepresentation could be found.

In addition to misrepresentations and corrections, there is, of course, a third group of authors, not included here, who have used Morgan's canon mostly or entirely appropriately or who discussed its implications or weaknesses appropriately, but who did not address the misrepresentation issue. No effort was made to include these except to cite a couple of examples now. For example, Roitblat's (1987) discussion of Morgan's canon on pages 31-32 seems appropriate, although he did appear to link it with Occam's razor on page 296. Roberts' (1998) discussion of Morgan's canon on pages 7-9 seems exceptionally well done, although he, too, linked the canon to the simplicity criterion (see last whole paragraph on page 8). In any case, additions to the references cited in this paper and comments about it are encouraged.

Concerning the quoted examples of misrepresentation of Morgan's canon in Appendix 1, considerable effort was made to avoid misrepresenting the authors' intentions, for example, by obscuring the context. The reader is *urged* to read the original sources and judge for her/himself whether the selected quotations accurately represent the authors' intentions as quoted here.

In some cases, an author who misrepresented Morgan's canon in the ways quoted in Table 2 may also have addressed it correctly (or incorrectly) in other ways not addressed here (e.g., Boakes, 1984, Dewsbury, 1984). However, except for Adams (1928), who was included for his early involvement, and Boring (1929, 1950) who was included for the impact he likely had on many psychologists' understanding of Morgan's canon, it was deemed likely to be too tedious to try to sort the correct use from the misrepresentation in most such cases. The reader is encouraged to read Boakes (1984) and Dewsbury (1984).

### Consideration of Some of the Information in Appendixes 1 and 2.

In fairness to Dewsbury, the quotations attributed to him in Appendix 1 for the years 1973 and 1978 occurred before he was on record (Dewsbury, 1979) as having read Morgan's *An Introduction to Comparative Psychology* (1894). In addition to drawing, presumably, on having read Morgan's book, Dewsbury (1984) drew on Newbury (1954; see Appendix 2) and others (e.g., Gray, 1963, and Nagge, 1932; see Appendix 2) who had pointed to the misrepresentation of Morgan's canon. Dewsbury (1984) wrote:

In the prevailing view, Morgan's canon is essentially equivalent to the "law of parsimony" or "Occam's razor." My first teacher in the history of psychology, P. L. Harriman, termed Morgan's canon "a restatement of the principle, expounded by William of Occam" (1947, 225-226; see also 255)... This appears generally inaccurate." (p. 187)

Please see inclusion of Harriman (1947) in Appendix 1 as well as Wozniak's (1993) consideration of Harriman in Appendix 2. Nevertheless, in Dewsbury's (1984) view, Morgan's canon and the law of parsimony continued to be "...two closely related principles." (p. 188)

By 2000, Dewsbury had reduced Morgan's canon and parsimony to only being "related" as opposed to being "closely related" (see Dewsbury, 2000, in Table 2), but whether they are "closely related" or "related" in Dewsbury's view is a separate question from what Morgan intended by the canon. If, as it seems reasonable to suggest, Dewsbury "directly helped" Barrows (see Barrows, 1995, in Appendix 1) construct the entry for Morgan's canon, where Occam's razor and the law of parsimony were listed as being *synonyms*, then, it is reasonable to suggest that Dewsbury, despite his more recent, carefully qualified statements (Dewsbury, 2000, see Appendix 1), has continued to maintain the view he expressed in 1973 (see Appendix 1) and to associate Morgan's canon with the law of parsimony, Ockham's razor, and/or with a simplicity criterion. In view of the history of efforts to correct such misrepresentation (Appendix 2), continued associations of Morgan's canon with Ockham's razor, the law of parsimony, or a simplicity criterion contributes to its misinterpretation and misrepresentation.

#### How Morgan's Canon is Represented in Contemporary History of Psychology Textbooks

Table 2 summarizes representations and misrepresentations of Morgan's canon in 16 (counting Leahey 2000 and 2001 as one) contemporary (i.e., 1991 - 2001) textbooks in the history of psychology. While in most cases, the authors' views in terms of the categories indicated in the table were sufficiently clear, in a few cases, they were not. Again, readers are urged to read the sources cited and decide for themselves whether Table 2 accurately represents the textbooks authors' views. The "richness" of misrepresentation is not always reflected by the table. For example, Goodwin (1999) headed the section that included coverage of Morgan's canon with the large-type, bold-print, CONWY LLOYD MORGAN (1852-1936): THE PRINCIPLE OF PARSIMONY.

Table 2 does not reflect that some writers provided generally appropriate discussion of Morgan's canon that was, perhaps, only slightly marred by misrepresentation. For example, Benjafield's (1996) discussion of Morgan's canon drew on Costall (1993; see Appendix 2) and reflected Costall's views well on the point that Morgan's canon was not anti-anthropomorphic; however, Benjafield also wrote that the canon "urged" explanation in terms of "simpler cognitive processes."

Table 2: Representation of Morgan’s Canon by Contemporary History of Psychology Textbooks. A “Yes” entry means Morgan’s canon was addressed in conjunction with that category and was *misrepresented*. A “No” entry means that Morgan’s canon was addressed in that category and was *not misrepresented*. For example, Benjamin (1997) said, in effect, that Morgan’s canon was intended to be anti-anthropomorphic but Benjafield (1996) said, in effect, that Morgan’s canon was *not* intended to be anti-anthropomorphic.

Categories:	Morgan’s Canon Advocated:				
	Parsimony	Occam’s	Simplicity	Anti-anthro.	Anti-anec.
Textbooks:					
Benjafield, 1996			Yes	No	
Benjamin, 1997	Yes			Yes	
Bolles, 1993 <sup>1</sup>					
Brennan, 1998	Yes			Yes	
Fancher, 1996 <sup>2</sup>					
Goodwin, 1999	Yes			Yes	Yes
Guthrie, 1998 <sup>2</sup>					
Hergenhahn, 2001			Yes		Yes
Hothersall, 1995	Yes				
Hunt, 1993		Yes			
Leahey, 2000/2001			Yes		
Schultz... 2000	Yes			No	
Smith, 1997			No	No	
Thorne...2001	No	No	No		No
Viney & King, 1998	Yes	Yes		Yes	
Watson/Evans, 1991 <sup>3</sup>					

<sup>1</sup>Morgan’s canon was addressed appropriately but with not in terms of any of the categories here.

<sup>2</sup>Neither Fancher nor Guthrie addressed Morgan’s canon.

<sup>3</sup>Referred to Morgan as being anti-anecdotal. It was suggestive but unclear whether that was

In any case, 14 of the 16 textbooks that were examined addressed Morgan's canon, which suggests that it is a sufficiently important topic to include in most history of psychology textbooks. However, to a greater or lesser degree, 10 of the 14 textbooks (or 11, depending on how one views Watson & Evans, 1991; see footnote 3 in Table 4) misrepresented Morgan's canon. It is somewhat discouraging that the textbooks currently used to teach history of psychology would show such a high proportion of misrepresentation of a topic covered by so many of them. However, Bolles (1993; now deceased), Smith (1997) and Thorne and Henley (2001) should be commended for their coverage of Morgan's canon. An encouraging note is that Costall's article (1993; and see Table 3) is having a good influence as exemplified by Thorne and Henley's coverage and most of Benjafield's (1996).

Elsewhere (Thomas, 1997a; updated here to include all 17 textbooks cited in Table 2) I have reported a similar survey of the representation in history of psychology textbooks of another topic, the discovery of the "speech center." That survey revealed that 13 of 16 (again, counting Leahey, 2000/2001 as one) addressed the topic and that 9 of the 13 misrepresented it as follows. The nine attributed the discovery to Pierre Paul Broca (1824-1880) alone, ignoring others such as Simon Alexandre Ernest Auburtin (1825-1893) and Jean Baptiste Bouillaud (1796-1875) who deserve more credit than did Broca. Representing it appropriately among history of psychology textbooks were Benjamin (1997), Fancher (1996), Hothersall (1995) and Thorne & Henley (2001). The degree of misrepresentation in history of psychology textbooks on this topic may be contrasted with its coverage in contemporary histories of neuroscience where 4 of 4 represented it correctly (Finger, 1994; Marshall & Magoun, 1998; Plum & Volpe, 1987; Young, 1970/1990).

**Update, 31 January 2015.** Please see updated textbook reviews on Morgan's canon and Broca's alleged discovery of the speech center, together with three additional topics, in:

Thomas, R. K. (2007). Recurring errors among recent history of psychology textbooks. *American Journal of Psychology*, 120, 477-495.

Considering the examples of misrepresentation of Morgan's canon and the discovery of the speech center and other misrepresentations (see box above) in history of psychology textbooks, one wonders how they might stand up to comparable assessments on other topics. I hasten to say it that takes considerable desire and stamina to attempt to write a history of psychology. Those who do it reasonably well have my admiration and respect.

### Concluding Remarks

#### Morgan's Revisionist Views

As the years passed, Morgan changed some of his earlier positions, and his belated changes likely contributed to the misrepresentation of Morgan's canon. For example, in *Animal Behaviour*, Morgan (1900) appeared to link simple and complex to lower and higher processes,

respectively. In the context of considering conscious control and the role of memory in the behavior of a chick, Morgan wrote:

It may still be said, however, that in selecting an example from so highly organized an animal as a bird, we are taking for granted that a complex case of controlled behavior may fairly be accepted as a type of more simple cases. Unfortunately, the only being with whose power of conscious control we have any first hand acquaintance is possessed of an nervous system even more organized than that of a chick. Our psychological interpretations are inevitably anthropomorphic. All we can hope to do is to reduce our anthropomorphic conclusions to their simplest expression.” (p. 48).

Thus, while this might seem to favor simple over complex explanations or to link higher and lower processes to complex and simple, respectively, precisely what this meant is unclear in terms of advocating a simplicity criterion, and it has no meaningful connection to Ockham’s razor or the law of parsimony. Furthermore, who can say what “reduce our anthropomorphic conclusions to their simplest expression” means?

Morgan clearly revised his opinion about the value of anecdotes as the following quotations will demonstrate. In 1890, Morgan wrote:

I do not propose to bring forward a number of new observations on the highly intelligent actions which animals are capable of performing. Mr. Romanes has given us a most valuable collection of anecdotes on the subject in his volume on “*Animal Intelligence*.” (p. 362)

Consistent with this, a portion of Morgan’s eulogy for Romanes included the following (as quoted in Sanderson’s, 1895, tribute to Romanes in the *Proceedings of the Royal Society of London*; see also E. Romanes (1902, p. 202):

...by his patient collection of data, by his careful discussion of these data in the light of principles clearly formulated; by his wide and forcible advocacy of his views, and above all by his own observations and experiments, Mr. Romanes left a mark in this field of investigation and interpretation which is not likely to be effaced.  
(Quoted in Sanderson, 1895, p. xiii)

This was being said about the time *An Introduction to Comparative Psychology* (1894) and Morgan’s canon were being published. Morgan acknowledged Romanes’ death in a highly complimentary footnote that was added to the book’s Preface *after* the Preface had been written. The phrase above from the eulogy, “discussion of these data in the light of principles clearly formulated,” strongly suggests that Morgan’s reference was meant to include if not emphasize the anecdotal data (see below in conjunction with “principles clearly formulated”).

However, by 1897, Morgan had begun to question Romanes' use of anecdotal data. Morgan's (1897) biographical sketch of Romanes written for the *Dictionary of National Biography* included:

In 1881 [sic] he published in the 'International Scientific Series' under the same title [*Animal Intelligence*] that he had given to his Dublin lecture, a collection of data, perhaps too largely anecdotal, respecting the mental faculties of animals in relation to those of man. (Volume XLIX, p. 178)

In his autobiographical chapter, Morgan (1932) wrote:

With regard to Romanes collection of anecdotes, psychologically interesting in its way, I felt, as no doubt he did, that not on such anecdotal foundations could a science of comparative psychology be built. Most of the stories were merely casual records, supplemented by amateurish opinions of passing observers who psychological training was well-nigh negligible. (p. 247)

Particularly related to the second sentence in this quotation and in defense of Romanes, it may be noted that most of the anecdotes that were used as data appeared in Romanes's book, *Animal Intelligence* (1882). Romanes made a considerable effort in the book's preface to express his concern about the use of anecdotes, and he stated several principles regarding collecting them, presenting them, and evaluating them. On the point of presenting the anecdotes, he apparently felt an obligation to quote them *verbatim* as much as possible and to abbreviate them only when necessary and as little as possible (see p. xi). This apparent sense of duty to the original observer probably cost Romanes a great deal in terms of tarnished reputation associated with his use of anecdotes.

For example, Romanes was belittled by the widely recognized founder of experimental psychology, Wilhelm Wundt, and by the first woman to earn a Ph.D. degree in psychology, Margharet Washburn (1908). Both (Wundt, 1896/1901; Washburn, 1908) belittled Romanes's anecdote associated with the "funereal habits" of ants. What they belittled was the original observer's interpretation of the ants' behavior (remember Romanes's self-imposed obligation to quote the anecdotal sources *verbatim*). There was no evidence that Romanes had accepted as valid the original observers' *interpretations*. Romanes quoted the anecdotes, presumably, to establish the fact that ants may bury other ants. He provided a reasonable and conservative interpretation that the burying behavior was based on natural selection to improve the sanitation of the colony (Romanes, 1882, p. 89), an interpretation that was apparently overlooked by his critics

I have not determined all the reasons that prompted Morgan's changing views regarding the value of the anecdotes, but one of Romanes's contemporary defenders, T. Wesley Mills provided an uncharitable opinion. Mills, whose approach to comparative psychology may be compared to Romanes's (and Morgan's at the time) and may be contrasted with E. L. Thorndike's

experimental method (e.g., Thorndike, 1898). Mills who engaged in public debate with Thorndike wrote:

But Professor Morgan is more and more in sympathy with the destructive school [an apparent reference to Thorndike], so that he now seems willing to surrender anything to all and sundry who may ask him to stand and deliver. (Mills, 1899, p. 271)

In any case, Morgan's views were revised over time as would be reasonable for any of the participants in this early stage of the development of comparative psychology. Nevertheless, when evaluating the representation of Morgan's canon and when citing 1894 as the source, to represent the canon accurately, one must represent Morgan's views when he wrote it. Please see Costall (1993, 1998) or Gray (1963b) for further discussion regarding why Morgan's canon should not have been interpreted as being anti-anecdotal nor anti-Romanes.

#### Morgan's Canon and the Changing *Zeitgeist*

Although this topic will not be developed here, the persistent misrepresentation of Morgan's canon as a canon of parsimony and as being anti-anthropomorphic fit the 'spirit of the times' when psychology was struggling to be recognized as an experimental science, and the misrepresented view of Morgan's canon fit well with that and with the emergence of behaviorism. With the re-assertion of "cognitive psychology" in the 1960s and the general replacement of the subfield of "animal learning" with "animal cognition," there has been a renewed interest in and efforts to justify what has been termed "the new anthropomorphism" (Kennedy, 1992; see also Mitchell, Thompson, & Miles, 1997). Morgan's *original intentions* regarding the canon fit well with the current *Zeitgeist*.

### Author Note

Because the *History and Theory of Psychology Eprint Archive* did not involve the usual editorial review for acceptance, six weeks prior to posting this article, I asked 10 scholars with credentials in the history of psychology or comparative psychology to review the manuscript. Darryl Bruce, Nancy Innis, Edward Mulligan, and Robert Wozniak provided helpful criticism and suggestions for improvement, all of which were implemented. I am very grateful to them. Three of remaining six replied and said that they would try to review it, but they were unable to do so by the time I decided to “publish” the article. Of course, those who reviewed the manuscript are blameless for any errors that may remain.

### References

- Adams, D. K. (1928). The inference of mind. *Psychological Review*, *35*, 235-252.
- Adams, M. M. (1987). *William Ockham: Volume 1*. Notre Dame, IN: University of Notre Dame Press.
- Baenninger, R. (1994). A retreat before the canon of parsimony. *Contemporary Psychology*, *39*, 505-507.
- Barrows, E. M. (1995). *Animal behavior desk reference*. Boca Raton: CRC Press.
- Battig, W. F. (1962). Parsimony in psychology. *Psychological Reports*, *11*, 555-572.
- Bekoff, M, & Allen, C. (1997). Cognitive ethology: Slayers, skeptics, and proponents. In R. W. Mitchell, N. S. Thompson, & H. L. Miles (Eds.). *Anthropomorphism, anecdotes, and animals* (pp. 313-334). Albany, NY: State University of New York Press.
- Benjafield, J. G. (1996). *A history of psychology*. Boston: Allyn and Bacon.
- Benjamin, Jr., L. T. (1997). *A history of psychology: Original sources and contemporary research (2nd ed.)*. New York: McGraw-Hill.
- Boakes, R. (1984). *From Darwin to behaviorism: psychology and the minds of other animals*. London: Cambridge University Press.
- Bolles, R. C. (1993). *The story of psychology: A thematic history*. Pacific Grove, CA:
- Boring, E. G. (1929). *A history of experimental psychology*. New York: The Century Co.

- Boring, E. G. (1950). *A history of experimental psychology*: (2<sup>nd</sup> ed.). New York: The Century Co.
- Boyd, R., Gasper, P., & Trout, J. D. (Eds.) (1991). *The philosophy of science*. Cambridge, MA: The MIT Press.
- Brennan, J. F. (1998). *History and systems of psychology* (5th ed.). Englewood Cliffs, NJ: Prentice Hall.
- Burghardt, G. M. (1985). Animal awareness: Current perceptions and historical perspective. *American Psychologist*, 40, 905-919.
- Burns, C. D. (1915). Occam's razor. *Mind*, 24, 592.
- Buytaert, E. M. (Ed.) (1958). *Philotheus Boehner, O.F.M., Ph.D.: Collected articles on Ockham*. St. Bonaventure, NY: Franciscan Institute Publications.
- Caldwell, W. E. (1960). Theoretical foundations of comparative psychology. In R. H. Waters, D. A. Rethlingshafer, & W. E. Caldwell (Eds.). *Principles of comparative psychology* (pp. 378-404). New York: McGraw-Hill.
- Costall, A. (1993). How Lloyd Morgan's Canon backfired. *Journal of the History of the Behavioral Sciences*, 29, 113-122.
- Costall, A. (1998). Lloyd Morgan, and the rise and fall of "animal psychology." *Society and Animals*, 6, 13-29.
- Costall, A., Clark, J.F.M. & Wozniak, R. H. (1997). Conwy Lloyd Morgan (1852-1936): An introduction to his work and a bibliography of his writings. *Teorie & Modelli*, 2, 65-92.
- Denny, M. R. (1980). *Comparative psychology: An evolutionary analysis of behavior*. New York: John Wiley & Sons.
- Dewsbury, D. A. (1973). Introduction. In D. A. Dewsbury, & D. A. Rethlingshafer (Eds.). *Comparative psychology: A modern survey* (pp. 1-18). New York: McGraw-Hill.
- Dewsbury, D. A. (1978). *Comparative animal behavior*. New York: McGraw-Hill.
- Dewsbury, D. A. (1979). C. Lloyd Morgan: Something old that's often new. *Contemporary Psychology*, 24, 677-680.
- Dewsbury, D. A. (1984). *Comparative psychology in the twentieth century*. Stroudsburg PA: Hutchinsin Ross Publishing Co.

- Dewsbury, D. A. (1993). On publishing controversy: Norman R. F. Maier and the genesis of seizures. *American Psychologist*, 48, 869-877.
- Dewsbury, D. A. (2000). Issues in comparative psychology at the dawn of the 20<sup>th</sup> century. *American Psychologist*, 55, 750-753.
- Dixon, E. T. (1892). "The Limits of Animal Intelligence." *Nature*, 46, 392-393.
- Epstein, R. (1984). The principle of parsimony: Some applications in psychology. *The Journal of Mind and Behavior*, 5, 119-130.
- Fancher, R. E. (1996). *Pioneers of psychology* (3rd ed.). New York: W.W. Norton.
- Finger, S. (1994). *Origins of neuroscience: A history of explorations of brain function*. New York: Oxford University Press.
- Flugel, J. C. (1933). *A hundred years on psychology*. London: Gerald Duckworth & Co.
- Goodwin, C. J. (1999). *A history of modern psychology*. New York; John Wiley & Sons.
- Gray, P. H. (1963a). Morgan's Canon: A myth in the history of comparative psychology. *Proceedings of the Montana Academy of Sciences*, 23, 219-224.
- Gray, P. H. (1963b). The Morgan-Romanes controversy: A contradiction in the history of comparative psychology. *Proceedings of the Montana Academy of Sciences*, 23, 225-230.
- Grier, J. W., & Burk, T. (1992). *Biology of animal behavior* (2<sup>nd</sup> ed.). St. Louis, MO: Mosby Year Book.
- Griffin, D. R. (1981). *The question of animal awareness*. New York: The Rockefeller University Press.
- Guthrie, R. V. (1998). *Even the rat was white*. Boston: Allyn & Bacon.
- Hamilton, W. (1855). *Discussions on philosophy and literature*. New York: Harper & Brothers, Publishers.
- Hamilton, W. (1869). *Lectures on metaphysics and logic. Volume I: Metaphysics*. (Edited by H. L. Mansel & J. Veitch). Boston: Gould and Lincoln.
- Harriman, P. L. (Ed.) (1947). *New dictionary of psychology*. New York: Philosophical Library.

- Hergenhahn, B. R. (2001). *An introduction to the history of psychology (4th ed.)*. Pacific Grove, CA: Brooks/Cole.
- Holmes, S. J. (1911). *The evolution of animal intelligence*. New York: Henry Holt and Co..
- Hothersall, D. (1995). *History of psychology (3rd ed.)*. New York: McGraw-Hill.
- Hunt, M. (1993). *The story of psychology*. New York: Doubleday.
- Kennedy, J. S. (1992). *The new anthropomorphism*. Cambridge: Cambridge University Press.
- Knoll, E. (1997). Dogs, Darwinism, and English sensibilities. In R. W. Mitchell, N. S. Thompson, & H. L. Miles (Eds.). *Anthropomorphism, anecdotes, and animals* (pp. 12-21). Albany, NY: State University of New York Press.
- Leahey, T. H. (2000). *A history of psychology: Main currents in psychological thought (5th ed.)*. Upper Saddle River, NJ: Prentice Hall.
- Leahey, T. H. (2001). *A history of modern psychology (3<sup>rd</sup> ed.)*. Upper Saddle River, NJ: Prentice Hall.
- Macphail, E. M. (1998). *The evolution of consciousness*. New York: Oxford University Press.
- Marshall, L. H., & Magoun, H. W. (1998). *Discoveries in the human brain*. Totowa, NJ: Humana Press.
- Maurer, A. (1999). *The philosophy of William of Ockham in the light of its principles*. Toronto: Pontifical Institute of Mediaeval Studies.
- Miller, G. A. (1962). *Psychology: The science of mental life*. New York: Harper & Row.
- Mills, W. (1899). The nature of animal intelligence and the methods of investigation it. *Psychological Review*, 6, 262-276.
- Mitchell, R. W., Thompson, N. S., & Miles, H. L. (Eds.) (1997). *Anthropomorphism, anecdotes, and animals*. Albany, NY: State University of New York Press.
- Moody, E. A. (1967). William of Ockham. In P. Edwards (Ed.). *The encyclopedia of philosophy: Volume 8*. (pp. 306-317). New York: Macmillan Publishing Co., Inc.
- Morgan, C. L. (1890). *Animal life and intelligence*. London: Edward Arnold.
- Morgan, C. L. (1894). *An introduction to comparative psychology*. London: Walter Scott, Ltd.

- Morgan, C. L. (1897). Romanes, George John (1848-1894). *Dictionary of National Biography, Volume LVII* (pp. 177-180). New York: The Macmillan Co.
- Morgan, C. L. (1900). *Animal behaviour*. London: Edward Arnold.
- Morgan, C. L. (1903). *An introduction to comparative psychology* (New ed., revised). London: The Walter Scott Publishing Co. Ltd.
- Munn, N. L. (1950). *Handbook of psychological research on the rat*. Boston: Houghton Mifflin Co.
- Nagge, J. W. (1932). Regarding the law of parsimony. *Journal of Genetic Psychology, 41*, 492-494.
- Newbury, E. (1954). Current interpretations and significance of Lloyd Morgan's Canon. *Psychological Bulletin, 51*, 70-74.
- Pearson, K. (1892). *The grammar of science*. London: Walter Scott.
- Pillsbury, W. B. (1929). *The history of psychology*. New York: W. W. Norton & Co.
- Plum, F., & Volpe, B.T. (1987). Neuroscience and brain function: From myth to public responsibility. In V.B. Mountcastle, F. Plum & S. R. Geiger (Eds.), *Handbook of physiology: Section 1: The nervous system*. Bethesda, MD: American Physiological Society.
- Richards, R. J. (1987). *Darwin and the emergence of evolutionary theories of the mind and behavior*. Chicago: University of Chicago Press.
- Roberts, W. A. (1998). *Principles of animal cognition*. New York: McGraw-Hill.
- Roberts, W. H. (1929). A note on anthropomorphism. *Psychological Review, 36*, 95-96.
- Roitblat, H. L. (1987). *Introduction to comparative cognition*. New York: W. H. Freeman, Co.
- Romanes, E. (1902). *The life and letters of George John Romanes* (5th ed.). London: Longmans, Green, and Co.
- Romanes, G. J. (1882). *Animal intelligence*. London : K. Paul, Trench.
- Romanes, G. J. (1883). *Mental evolution in animals*. London : K. Paul, Trench.
- Romanes, G. J. (1888). *Mental evolution in man*. London : K. Paul, Trench.

- Sanderson, J. B. (1895). George John Romanes. *Proceedings of the Royal Society of London*, 57, vii-ivx.
- Schultz, D.P., & Schultz, S.E. (2000). *A history of modern psychology* (7th ed.). Fort Worth, TX: Harcourt Brace College Publishers.
- Singer, B. (1981). History of the study of animal behaviour. In D. McFarland (Ed.). *The Oxford companion to animal behaviour*. (pp. 255-272). Oxford: Oxford University Press.
- Smith, R. (1997). *The human sciences*. New York: W. W. Norton & Co.
- Stanley, H. M. (1896). Remarks on Professor Lloyd Morgan's method in animal psychology. *Psychological Review*, 3, 536-541.
- Thomas, R.K. (1997a, June). *Two contrasting views regarding the discovery of the speech center and recognition of its importance for the theory of localization of brain function*. Poster presented at the meeting of Cheiron: The International Society for the History of the Behavioral and Social Sciences, Richmond, VA.
- Thomas, R. K. (1997b). Correcting some Pavloviana regarding "Pavlov's Bell" and Pavlov's "mugging." *American Journal of Psychology*, 110, 115-125.
- Thomas, R. K. (1998). Lloyd Morgan's Canon. In G. Greenberg & M. M. Haraway (Eds.). *Comparative psychology: A handbook*. (pp. 156-163). New York: Garland Press.
- Thornburn, W. M. (1915). Occam's razor. *Mind*, 24, 287-288.
- Thorndike, E. L. (1898). Animal intelligence: An experimental study of the associative processes in animals. *The Psychological Review: Monograph Supplements*, II, No. 4 (Whole No. 8). 1-109.
- Viney, W., & King, D. B. (1998). *A history of psychology*. Boston: Allyn & Bacon.
- Walker, S. (1983). *Animal thought*. London: Routledge and Keegan Paul.
- Washburn, M. F. (1908). *The animal mind: A text-book of comparative psychology*. New York: The Macmillan Co.
- Warden, C. J. (1927). The historical development of comparative psychology. (IV. From the sixteenth century to Darwin. V. The modern experimental movement.). *Psychological Review*, 34, 135-168.
- Waters, R. H. (1939). Morgan's Canon and anthropomorphism. *Psychological Review*, 46, 534-540.

- Waters, R. H., Rethlingshafer, D. A., & Caldwell, W. E. (1960). *Principles of comparative psychology*. New York: McGraw-Hill.
- Watson, Sr., R. I., & Evans, R. B. (1991). *The great psychologists: A history of psychological thought* (5th ed.). New York: HarperCollins Publishers.
- Wozniak, R. H. (1993). Conwy Lloyd Morgan, mental Evolution, and *the Introduction to comparative psychology*: An introduction. (Introduction to re-publication). Morgan, C. L. *Introduction to comparative psychology*. London: Routledge/Thoemmes Press. (Original work published 1894)
- Wundt, W. (1896/1901). *Lectures on human and animal psychology, 2nd ed.*. Translated by J. E. Creighton & E. B. Titchener. London: Swan Sonnenschein & Co.
- Young, R. M. (1970/1990). *Mind, brain, and adaptation in the nineteenth century*. New York: Oxford University Press.

## Appendix 1 (pp. 24-28)

Selected Quotations in Chronological Order that Illustrate the History of Misrepresentations of Morgan's Canon. Explanatory/supplementary comments are in brackets..

---

**Stanley (1896, p. 541)**

His [Morgan's] caution is also admirable, but we do not think the law of parsimony is positive proof as he seems to urge.

**Mills (1899, p. 271)**

Nor can I agree with those who maintain that we must always adopt the *simplest* explanation of an animal's action.

**Washburn (1908, p. 25)**

[Immediately after quoting Morgan's canon...] In other words, when in doubt take the simpler interpretation.

**Holmes (1911, p. 159)**

...it is well in general to be guided by the principle enunciated by Lloyd Morgan, which is a sort of special case of the law of parsimony.

**Warden (1927, p. 155)**

The canon of Morgan...was an attack against the prevailing anthropomorphism....The canon is merely the law of parsimony applied to animal psychology.

**Adams (1928, p. 241)**

[Immediately after quoting Morgan's canon...] This is plainly intended as an adaptation to the problems of animal psychology of the general Law of Parsimony....

**Boring (1929, pp. 464-465)**

[Morgan]...who undertook to offset the anthropomorphic tendency in the interpretation of the animal mind by an appeal to the 'law of parsimony.' This law applied to animal psychology is often known as 'Lloyd Morgan's canon.'

**Pillsbury (1929, p. 283)**

He [Morgan] is deserving of credit for urging what he calls the law of parsimony in the interpretation of mental phenomena in animals....

**Flugel (1933, pp. 123-124)**

The reaction started with Lloyd Morgan, who, in the nineties, endeavored to combat the dangers of the anecdotal method by the "law of parsimony", according to which we must always explain animal behaviour in terms of the simplest mental processes that will account for the facts.

**Waters (1939, p. 534)**

Morgan's canon was offered as just such a check [against the use of anecdotes and anthropomorphism]. Its immediate effect was to outlaw at once any description of animal behavior as due to mental processes.

**Harriman (1947, pp. 225-226; 255)**

[These definitions appeared in Harriman's, *The New Dictionary of Psychology*.]

Morgan's canon: C. Lloyd Morgan's axiom to the effect that the simplest explanation of all known facts is the best hypothesis or theory. It is a restatement of the principle expounded by William of Occam (c. 1325) and known as Occam's razor.

parsimony, law of: Lloyd Morgan's statement (1900) that animal behavior should be described in the simplest possible terms. It is an application of Occam's razor to animal psychology. Occam (1280-1349) had said that entities should not be multiplied beyond necessity; and Morgan accepted this view, indicating that anecdotes, attribution of human mental activities to animals, and projection of introspections have no place in animal psychology.

**Munn (1950, pp. 1-2)**

Lloyd Morgan...advocated a curb on anthropomorphic speculation....His well known principle of parsimony for students of animal behavior read as follows:...

**Caldwell (1960, p. 401)**

Morgan gave comparative psychology his interpretation of the law of parsimony, which curbed the tendency of observers of animals to anthropomorphize.

**Dewsbury (1973, p. 9)**

He proposed a law which has been variously termed Occam's razor, the law of parsimony, and Lloyd Morgan's canon....Lloyd Morgan's canon seems applicable today. If alternative explanations appear truly equal, the simpler is to be preferred until data require postulation of more complex processes.

**Dewsbury (1978, p. 10)**

Morgan is best known for opposing unbridled anthropomorphism. According to the often-cited "law of parsimony" or "Lloyd Morgan's canon...." The admonition that we should strive to accept the simpler of two equal alternative explanations is certainly good advice for many situations.

**Denny (1980, p. 4)**

C. Lloyd Morgan, author of the famous Canon of Parsimony, dealt explicitly with animal behavior.

**Griffin (1981, p. 118)**

This [Morgan's canon] has been widely interpreted as requiring that complex functions should not be postulated if a simpler explanation will suffice. That is the widely accepted principle of parsimony...

[The above and elsewhere (p. 99) Griffin accepted the interpretation that Morgan's canon is a canon of parsimony. However, Griffin also accepted (p. 131) Miller's view (1962; Table 3) that the canon was not anti-anthropomorphic.]

**Boakes (1984, p. 40)**

The canon can be seen as simply the application of the general law of parsimony to explanation of behavior. Nevertheless, Morgan did not justify it on these terms but on the grounds of evolutionary theory.

**Dewsbury (1984, pp. 188)**

The law of parsimony and Morgan's canon are two closely related principles.

**Epstein (1984, pp. 122-123)**

Morgan was a British psychologist and biologist who, in *An Introduction to Comparative Psychology*, published in 1894, challenged the tendency of some naturalists of his day to attribute

human characteristics to animals....Morgan was no less a mentalist than Romanes, but he took a more conservative stand. Just as evolution had produced organisms that varied from the simple, to the complex, he argued, so must it have produced minds that varied from the simple to the complex. It would therefore be presumptuous of us to infer higher mental activities in animals where simpler ones would do. He expressed this in his famous Canon, sometimes called the Canon of Parsimony.

**Grier & Burk (1990, p. 52)**

Among his other contributions, he rejected anecdotalism and undisciplined anthropomorphism in the interpretation of behavior in other animals. He called for a principle of theoretical parsimony (i.e., the simplest explanation) which became known as Morgan's canon:....

**Baenninger (1994, p. 805)**

[Baenninger's was a book review titled "A Retreat before the Canon of Parsimony." The book being reviewed was Donald R. Griffin's book, *Animal Minds*.]

C. Lloyd Morgan's Canon of Parsimony is not mentioned in the index but it casts a long shadow over this important book.

**Barrows (1995, pp. 308, 358, and 385)**

[Barrows' quotations appear in his book, *Animal Behavior Desk Reference*, which may be compared to a dictionary and/or encyclopedia. Relevant to the present work were the entries for "Morgan's canon," "Ockham's razor," and "law of parsimony." Given that Dewsbury was cited as a reference source within the entry for "Morgan's canon," it may be pertinent to note that Dewsbury (cited here in Table 2 above and below) was one of the 13 individuals identified in the book's Acknowledgment as having "...directly helped with this book...."]

[p. 308] Morgan's canon. [after quoting the canon, the entry continued] that is, one should interpret data using the most parsimonious explanation (Dewsbury, 1978, 10)....Syn. Law of parsimony, (Lloyd) Morgan's canon (Dewsbury 1978, p. 10) See law: law of parsimony. Cf. Ockham's razor.

[ p. 358] Ockham's razor. [included] Cf. Law: Law of parsimony; Morgan's canon; simplicity.

[p. 385] law of parsimony. [included] Cf. Morgan's canon, Ockham's razor.

**Bekoff & Allen (1997, p. 326)**

[After quoting Zabel at al. who wrote, " One must be cautious about inferring complex cognitive processes when simpler explanations will suffice," Bekoff and Allen wrote that which is quoted

below. Obviously, Bekoff and Allen considered Zabel et al.'s statement to be equivalent to Morgan's canon. However, as can be seen, they (with the aid of an anonymous reviewer) did try to distinguish Morgan's canon from parsimony.]

The statement by Zabel et al. is a paraphrase of Morgan's (1894) Canon:....It is possible that Morgan's Canon which is concerned with the complexity of processes should be distinguished from parsimony which is concerned with the number of processes needed to explain a given behavior (as an anonymous reviewer noted).

**Knoll (1997, p. 20)**

Those with a fondness for neatly organized historical eras might say that Morgan's Canon, as it is called, marks the end of the anthropomorphic strategy in psychology and the beginning of twentieth century behaviorism. [Paragraph break] However, Morgan's Canon is a double-edged sword....It can cut up as well as down....if we cannot anthropomorphize the animals, we cannot anthropomorphize ourselves either.

**Macphail (1998, p. 80)**

What animal psychology needed, then, was...second, the theoretical discipline to interpret the results in as parsimonious a way as possible - a discipline crystallized by the British psychologist Conwy Lloyd Morgan (1852-1896) in his well known canon:....

**Dewsbury (2000, p. 751)**

In his classic textbook, Morgan (1894) outlined his famous canon that an animal's behavior should be interpreted in terms of the psychologically simplest processes consistent with the data. Morgan's canon, and its related concept, parsimony, spread widely during this period.

---

## Appendix 2 (pp. 29-32)

Quotations in Chronological Order to illustrate the History of Efforts to Correct the Misrepresentation of Morgan's Canon. Explanatory/supplementary information is in brackets.

---

**Adams (1928, pp. 241-242)**

Morgan's canon, however, instead of being as commonly considered, a special case of the law of parsimony, is not related...and may on occasion work to exactly opposite effect....Here is Morgan trying to adapt the law of parsimony to psychology and violating it in the same breath by 'multiplying entities' making quantities of unnecessary assumptions.

[Adams's (1928) quotation from this same article in Table 2 makes a dubious entry for Table 3.]

**Boring (1929, 1950)**

[In his "NOTES" at the end of the chapter in which Morgan's canon was addressed, Boring (1929, p. 487; 1950, p. 498) wrote that which is quoted below. Other than minor word changes, the principal difference between the two editions is that in 1950 (quoted here), the Latin phrase was added. The phrase is Boring's playful revision of what he erroneously believed to be Ockham's razor (see the "Ockham's razor" section presented earlier here). Boring omitted "non" between "Entia" and "sunt" and substituted "propter" for "praeter," thereby reversing the intent of Ockham's razor. Given the misrepresentation of Morgan's canon as quoted here as well as quotations from Boring in Table 2, this is a dubious entry for Table 3.]

**Lloyd Morgan was justified in using it [the canon] against the tendency to anthropomorphize animals..., but conditions have changed today in comparative psychology. Cf. D. K. Adams's criticism of the use of the law [of parsimony], *The inference of mind. Psychol. Rev.*, 1928, 35, 235-252. *Entia sunt multiplicanda propter necessitatem.* [Entities should be multiplied on account of necessity.]**

**Nagge (1932, p. 492-493)**

Lloyd Morgan...has laid down a canon of interpretation which has come to be known to psychologists as the law of parsimony....This canon seems to have undergone a transformation in general psychological usage until it might now be tentatively expressed thus: of any possible number of explanations of an animal act the simplest possible explanation should be employed....

[Nagge appropriately explained the canon and also addressed issues related to the law of parsimony. It seems clear that "undergone a transformation" and "come to be known...as the law of parsimony" was seen by Nagge as reflecting a misrepresentation of Morgan's canon.]

**Newbury (1954, p. 73)**

Aside from their historical inaccuracies, many current misinterpretations of Morgan's Canon have *sui generis* failed to take advantage of possible logical developments. Without contending that Morgan's methodology represents the last word, one can recognize in it some of the essentials for integrating modern introspective and comparative psychology. Whether this gain through historical continuity can be realized depends upon an accurate and significant interpretation of that methodology, including the Canon.

[Before concluding the above, Newbury cited 10 references where the canon had been misinterpreted as a version of the law of parsimony, 7 references (including 5 of the parsimony-10-references) interpreted the canon as a doctrine of simplicity, and 4 (all among the parsimony-10) related to Occam's razor. Newbury also cited other forms of misinterpretation, and he provided a detailed analysis of how Morgan's canon should be interpreted.]

**Miller (1962, p. 214-215)**

Subsequent generations of psychologists have called this Lloyd Morgan's canon and have assumed that what he must have meant was that anthropomorphism - attribution of human characteristics to gods or, as in this case animals - is unscientific. A glance into Morgan's books, however, is enough to refute this assumption. Like all of his contemporaries, Morgan took it for granted that since the only psychical faculties we can know anything about directly are our own, "introspection must inevitably be the basis and foundation of all comparative psychology."<sup>3</sup> [footnote 3 is "Morgan (1894, p. 37)."] Any Human introspection would necessarily be anthropomorphic; all that Morgan hoped for were a few reasonable rules for playing the game.

**Gray (1963, pp. 221-222)**

[Gray provided his analysis of what Morgan intended, identified some of the misinterpretations of Morgan's canon, and ridiculed them as the following examples show.]

Boring, Flugel, and Skinner have referred to the Canon as a law of parsimony. Had it been such a law, surely it would have reduced Morgan's entities; instead, it was compatible with their multiplication....[Paragraph break] Likewise, Thorpe's assumption that the Canon is related to Occam's razor is merely gratuitous....[Paragraph break] Waters' statements [e.g., Waters, 1939, in Table 2], not only are contrary to historical fact, but are also incorrect.

**Singer, 1981, p. 268)**

Some workers took this principle too seriously and would not allow any interpretation of an advanced process, even if suggested by the evidence, and in 1900 Lloyd Morgan was obliged to add the following rider to his canon: 'To this it may be added - lest the range of the principle be misunderstood - that the canon by no means excludes the interpretation of a particular act as the

outcome of higher mental processes if we already have independent evidence of their occurrence in the agent (*Animal Behavior*). [Unfortunately, Lloyd Morgan's emendation has been almost totally ignored, and errors of one kind have been replaced by errors of the other.]

**Costall (1993, pp. 116-117)**

[Costall's entire paper is a discussion of the misrepresentation of Morgan's canon. Hence, selecting excerpts to quote was difficult. I have inserted within brackets the citations that Costall cited in his footnotes. The two references not otherwise addressed in the present paper (viz., Richards, 1987, and Walker, 1983) have also been added to the References section for the present paper.]

Later commentators have consistently represented this [Morgan's canon] as an appeal to Occam's razor, a principle of parsimony; they have taken it as an outright prohibition against treating animals as anything other than mechanical automata; and they have characterized it as a rejection of anthropomorphism. [Six paragraphs later.] Morgan's canon as currently misconstrued has very much the character of a myth.<sup>31</sup> [Gray, 1963] Indeed, many of those wishing to counter the implications of this myth have themselves managed to perpetuate the myth itself.<sup>32</sup> [Walker, 1983] It has evidently been highly resistant to several attempts at correction.<sup>33</sup> [Burghardt, 1985; Newbury, 1954; Singer, 1981] Indeed the two most informative recent accounts of Morgan's work make no attempt to question the accepted view of the canon.<sup>34</sup> [Boakes, 1984; Richards, 1987]

**Wozniak (1993, ix-x)**

[After quoting examples where Skinner (1938), Griffith (1943), and Harriman (1947, and see table 2 here) associated Morgan's canon closely with the law of parsimony, Wozniak wrote:]

One thing is virtually certain - neither Skinner, nor Griffith, nor Harriman could ever have read Lloyd Morgan. Even if one set out deliberately to distort the meaning of Morgan's canon, it would be virtually impossible to do so with greater success. Morgan's canon is not a principle of parsimony,<sup>8</sup> [see below] it was not formulated as a guide to the description of behavior, it does not dispense with mental faculties, it is not an appeal to the observable, and it is not meant to be specific to animal psychology. Even worse, it is consciously anthropomorphic and based squarely on the adequacy of the psychologist's personal introspection.

<sup>8</sup> It would be an interesting study in itself to trace the progressive distortion of Morgan's views and in particular the attribution to Morgan of the principle of parsimony. Although earlier writings may also have misinterpreted Morgan in this fashion, it seems likely that Boring [Boring, E. G. (1929). *A history of experimental psychology*. NY: Century] was one of the more influential culprits. See especially pp. 464-465. [See Boring quotations in Table 2 here.]

**Costall, Clark, & Wozniak (1997, p. 66)**

Morgan's canon has been consistently overinterpreted. It was not a prohibition against the application of intentionalistic descriptions to animals, but rather an attempt by Morgan to put 'anthropomorphism' on a more secure scientific footing (Costall, 1993).

**Costall (1998, p. 18)**

When Morgan realized his intentions were being misinterpreted, he added the clarification that "the Canon by no means excludes the interpretation of a particular activity in terms of the higher mental processes, if we already have independent evidence of the occurrence of these higher processes in the animal under observation (Morgan, 1903, p. 59). Nor, contrary to most accounts, was the canon, in any simple sense, an appeal to the principle of parsimony - an invitation to be economical with the truth....His serious point was that there were very good Darwinian reasons for supposing that animals should vary in the nature of their mentality. The canon was, therefore, Morgan's attempt to put "anthropomorphism," the psychological approach to animals, on a secure scientific footing (Costall, 1993). [Paragraph break.] The extent to which the intentions of Morgan's canon have been misinterpreted is astonishing.

**Thomas (1998, p. 156)**

Clearly Morgan's canon was intended to be a stricture to guide the interpretation of evidence pertaining to psychological processes in animals, but the misrepresentation of that canon that occurred early...and that continues in the present...is that it was a canon of parsimony or simplicity.

---

meant to contribute to the impetus for the canon (see Watson & Evans, 1991, p. 329).