

promoting access to White Rose research papers



Universities of Leeds, Sheffield and York
<http://eprints.whiterose.ac.uk/>

This is an author produced version of a paper published in **British Journal for the History of Science**

White Rose Research Online URL for this paper:
<http://eprints.whiterose.ac.uk/3257/>

Published paper

Radick, G. (2000) *Morgan's Canon, Garner's Phonograph, and the Evolutionary Origins of Language and Reason*, *British Journal for the History of Science*, Volume 33 (1), 3 - 23.

Morgan's canon, Garner's phonograph, and the evolutionary origins of language and reason†

GREGORY RADICK*

Abstract. 'Morgan's canon' is a rule for making inferences from animal behaviour about animal minds, proposed in 1892 by the Bristol geologist and zoologist C. Lloyd Morgan, and celebrated for promoting scepticism about the reasoning powers of animals. Here I offer a new account of the origins and early career of the canon. Built into the canon, I argue, is the doctrine of the Oxford philologist F. Max Müller that animals, lacking language, necessarily lack reason. Restoring the Müllerian origins of the canon in turn illuminates a number of changes in Morgan's position between 1892 and 1894. I explain these changes as responses to the work of the American naturalist R. L. Garner. Where Morgan had a rule for interpreting experiments with animals, Garner had an instrument for doing them: the Edison cylinder phonograph. Using the phonograph, Garner claimed to provide experimental proof that animals indeed spoke and reasoned.

In the nineteenth century, there was little scepticism about the powers of animal minds. In the twentieth century, there was a great deal of scepticism. In between came a rule of method known as 'Morgan's canon'. The Bristol geologist and zoologist Conwy Lloyd Morgan (1852–1936) announced what he was later to call his 'canon' in August 1892 as follows: 'in no case is an animal activity to be interpreted as the outcome of the exercise of a higher psychical faculty, if it can be fairly interpreted as the outcome of the exercise of one which stands lower in the psychological scale'.¹ From the vantage point of present-day psychology, Morgan's canon stands, in the words of one commentator, as 'possibly the most important single sentence in the history of the study of animal behavior'.² Why? Because built into the canon is the still influential view that objectivity and anthropomorphism are mutually exclusive. Referring to L. H. Morgan's 1868 claim that beavers command engineering know-how, the ethologist Aubrey Manning writes, 'We now know better, and follow another Morgan – Lloyd – whose "canon" exhorts us never

† This paper was awarded the Society's Singer Prize for 1998.

* Department of History and Philosophy of Science, University of Cambridge, Free School Lane, Cambridge CB2 3RH, UK.

I am grateful to Simon Schaffer, Robert Richards, M. J. S. Hodge and several anonymous referees for helpful comments on earlier drafts, and to the organizers and participants at the ISHPSSB conference, Oaxaca, July 1999, where a version of this paper was presented.

1 C. L. Morgan, 'The limits of animal intelligence [1892]', in *International Congress of Experimental Psychology, Second Session*, London, 1892, 44–8, 44. For later statements of the canon in Morgan's work, see E. Newbury, 'Current interpretation and significance of Lloyd Morgan's canon', *Psychological Bulletin* (1954), 51, 70–4, 70, and B. Singer, 'History of the study of animal behaviour', in *The Oxford Companion to Animal Behaviour* (ed. D. McFarland), Oxford, 1981, 255–72, 268.

2 B. G. Galef, Jr., 'Historical origins: the making of a science', in *Foundations of Animal Behavior: Classic Papers with Commentaries* (ed. L. D. Houck and L. C. Drickamer), Chicago, 1996, 5–12, 9.

to interpret behaviour using complex psychological processes if simpler ones will serve.³ Since the latter Morgan and his canon, objective observers have appealed whenever possible to quasi-mechanical processes such as trial-and-error learning and imitation, rather than understanding and purpose-guided planning, to explain how animals come to act in apparently clever ways. What Morgan called ‘reason’ is presumed absent in animal minds until shown otherwise.

Histories of comparative psychology tend to present Morgan’s canon as a more or less inevitable product of the Victorian debate on animal instinct. Here I shall emphasize links with another, contemporary debate on the evolutionary origins of language and reason. Resituated thus, the success of the canon looks less of a foregone conclusion. The new context also makes certain puzzling features of the canon’s origins and early career newly intelligible. Consider Morgan’s scepticism about animal reason. Where did it come from? The answer matters because without it we risk taking the ‘canonization’ of comparative psychology for granted, as though something like it were bound to happen as the science of the animal mind matured.⁴ In the present historiography, readers can learn how Morgan’s scepticism informed his studies of trial-and-error learning (what Morgan called ‘intelligence’),⁵ or persisted alongside his monism,⁶ or fed the even deeper scepticism of the behaviourists whom he influenced,⁷ but not what drove it in the first place. I shall argue that behind Morgan’s scepticism about animal reason was a doctrine due to the Oxford Sanskrit scholar Friedrich Max Müller. According to Müller, language and reason went together, and belonged to humans alone. Morgan’s canon in effect turned this central theme of Müller’s comparative philology into a rule of method for comparative psychology. For Morgan, the canon was needed because animals, lacking language, probably lacked reason. The first part of this paper tracks the influence of Müller’s views on Morgan’s thought.

Recapturing the Müllerian origins of Morgan’s canon in turn helps with a second puzzle: Morgan’s own judgement, a year after proposing the canon, that the case against animal reason, and thus for the canon, was near to collapse. I refer to the conclusion of Morgan’s ‘The limits of animal intelligence’, published in August 1893:

I have expressed my opinion that, in the activities of the higher animals, marvellously intelligent as they often are, there is no evidence of that true perception of relationships which is essential to reason. But this is merely an opinion, and not a settled conviction. *I shall not be the least*

3 A. Manning, ‘The potential of parrots: do animals try to deceive each other?’, *Times Literary Supplement* (28 August 1998), 4–5, 4; L. H. Morgan, *The American Beaver and His Works*, Philadelphia, 1868, 258–70.

4 Cf. ‘Anecdotalism and anthropomorphism were not immediately exorcised – Darwin himself ... showed not infrequent lapses – but gradually they gave way before the advance of the more rigorous methodology of science’. L. S. Hearnshaw, *A Short History of British Psychology, 1840–1940*, London, 1964, 88.

5 R. Boakes, *From Darwin to Behaviourism: Psychology and the Minds of Animals*, Cambridge, 1984, 32–44.

6 R. Richards, *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior*, Chicago, 1987, 380–5. Richards (385, note 171) lists several contemporaries of Morgan’s who had independently proposed canon-like rules for comparative psychology.

7 A. Costall, ‘How Lloyd Morgan’s canon backfired’, *Journal of the History of the Behavioral Sciences* (1993), 29, 113–22.

*ashamed of myself if I change this view before the close of the present year. And the distinction between intelligence and reason will remain precisely the same if animals are proved to be rational beings the day after tomorrow.*⁸

What proof of animal reason pressed from so near a future? I shall argue that the proof in question was phonographic proof of ape language. When Morgan was writing, the American naturalist Richard Lynch Garner (1848–1920) was in the Congo, where, as Morgan and much of the rest of the world knew, the plan was to capture the ‘speech’ of wild gorillas and chimpanzees – the missing links of language – on the cylinders of the Edison phonograph. Garner accepted Müller’s argument that language and reason went together. What Garner did not accept was the humans-only rider on the argument. In Garner’s view, a phonograph cylinder full of remarkably human-like ape language would have ‘proved’ apes ‘to be rational beings’. In the summer of 1893 Garner was due back from his phonographic expedition among the apes ‘before the close of the present year’, perhaps ‘the day after tomorrow’. The second part of this paper introduces Garner and his phonographic research; the third part examines the evidence for Morgan’s developing awareness of Garner’s work from 1892 onwards.

This awareness is the key to solving a third puzzle about the canon. In an influential textbook of 1894, Morgan justified adoption of his canon without any mention whatsoever of language and how language (and hence reason) had set the human mind apart. For the first time, he recommended scepticism about animal reason not because of the absence of animal language, but because of the power of evolution to adapt species without constraint to their conditions of life. Why this switch from a language-based justification of the canon? Just as Garner’s phonographic research prompted the 1893 caveat, so, I shall argue, it prompted the 1894 justification switch. Garner’s phonograph threatened to reveal the presence of animal language, and so to remove the foundations from under Morgan’s reforms of comparative psychology. Obviously the threat was overcome: present-day students of the animal mind honour Morgan’s canon, not Garner’s phonograph. The fourth and final part of the paper briefly describes how these two methods came to such different ends. I shall argue that the phonographic method sank from view largely because of the scandal that engulfed Garner in 1894–6. At roughly the same moment, Morgan’s canon was taken up among the experimentalists who would go on to shape comparative psychology in the United States.

Animal language and animal reason: C. Lloyd Morgan

When Morgan announced his canon, he had been working in and around comparative psychology for ten years. His scientific career began at the Royal School of Mines in London, where he trained in the late 1860s and early 1870s as a mining engineer. Seated at dinner one night next to the school’s most famous professor, Thomas Henry Huxley, Morgan impressed Huxley enough to win an invitation to stay on as a research student

⁸ C. L. Morgan, ‘The limits of animal intelligence [1893]’, *Fortnightly Review* (1893), 54, 223–39, 239 (emphasis added).



R. L. Garner conducting phonographic experiments with monkeys in Central Park, New York City, December 1891. At the bottom of the illustration is a sketch of what Garner proposed to do shortly in the French Congo. Illustration by F. S. Church, *Harper's Weekly* (1891), 35, 1036. Courtesy of Widener Library, Harvard University.

after graduation. A year in Huxley's laboratory led on to a succession of short-term teaching and engineering jobs. In 1884, after a longish stint in South Africa, Morgan took up a professorship in geology and zoology at University College, Bristol, where he would remain for the rest of his long career, becoming principal of the College (later Bristol University) in 1887. As a geologist and zoologist, he was, he later recalled, 'no more than a tolerably conscientious hireling'. But comparative psychology engaged his interests and abilities to the full. Throughout the 1880s he worked to make the new science his own.⁹

Morgan first developed his views on the animal mind in a series of papers published between 1882 and 1886, largely in response to the work of the physiologist and psychologist George John Romanes.¹⁰ Romanes had claimed that animals have abstract thoughts – that the concept of 'good for eating', for example, passed through the mind of a dog as the dog sniffed at a biscuit. But, Morgan pointed out, no less an authority than Locke had claimed that 'the having of general ideas is that which puts a perfect distinction betwixt man and brutes, and is an excellency which the faculties of brutes do by no means attain to'. This quotation had formed the centrepiece of the argument on the origin of language in Müller's widely read *Lectures on the Science of Language* (1861, 1863), and Morgan cited 'Prof. Max Müller and other living thinkers' as advocates of the Lockean view.¹¹ By the 1880s Müller had become one of the most eminent public men of science in the English-speaking world. His views were well known: that language and reason were mutually entailing; that only humans had them; that this distinction marked a difference in kind between humans and other species; and that no evolutionary bridge spanned the gap between the irrational cries of animals and the rational roots of language, because the roots, the irreducible atoms of language, were fully conceptual and (more for Kantian than Lockean reasons) must have been so from the beginning. 'There is no thought without words, as little as there are words without thought' was Müller's maxim, endlessly repeated and defended.¹²

9 C. L. Morgan, 'C. Lloyd Morgan', in *A History of Psychology in Autobiography* (ed. C. Murchison), 8 vols., London, 1932, ii, 237–64, 248. See also E. Clarke's article on Morgan in the *Dictionary of Scientific Biography* (ed. C. C. Gillespie), 18 vols., New York, 1974, ix, 512–13.

10 See G. J. Romanes, 'Intellect in brutes', *Nature* (1879), 20, 122–5; *Animal Intelligence*, London, 1881; and *Mental Evolution in Animals*, London, 1883. On Romanes, see Richards, *op. cit.* (6), 346–53; Boakes, *op. cit.* (5), 24–32; and E. Knoll, 'The science of language and the evolution of mind: Max Müller's quarrel with Darwinism', *Journal of the History of the Behavioral Sciences* (1986), 22, 3–22, 12–17. The paper is an abstract from Knoll's 'Mental evolution and the science of language: Darwin, Müller, and Romanes on the development of the human mind', Ph.D. thesis, University of Chicago, 1987.

11 C. L. Morgan, 'Animal intelligence', *Nature* (1882), 26, 523–4, 523. Romanes had made the claim about a 'good for eating' concept in dogs in 'Intellect in brutes', *op. cit.* (10). He used the example again in *Mental Evolution in Man*, London, 1887, 27, attracting a sarcastic comment from St George Jackson Mivart in *The Origin of Human Reason*, London, 1889, 49–50. See Knoll, 'Müller's quarrel', *op. cit.* (10), note 63. The original source of the Locke quotation is J. Locke, *An Essay Concerning Human Understanding*, Book 2, Chapter 11, Section 10.

12 The main statements of Müller's case against an evolutionary origin for language and reason are 'The theoretical stage, and the origin of language', in *Lectures on the Science of Language*, 2 vols., London, 1861, 1863, i, Lecture 9, and 'Lectures on Mr. Darwin's philosophy of language', *Fraser's Magazine* (1873), 7, 525–41, 659–78; 8, 1–24. Both are reprinted in R. Harris (ed.), *The Origin of Language*, Bristol, 1996, 7–41 and 147–233 respectively. Page references in what follows are to the Harris volume. For Müller on Locke, see Müller, 'Theoretical', 16. For Müller's maxim, see Müller, 'Philosophy', 215. On Müller and the debates on mental evolution, see Knoll, *op. cit.* (10).

After contrasting Romanes's views with Müller's, Morgan distinguished different kinds of abstraction. His most important distinction was between abstraction-as-elimination and abstraction-as-isolation. When a dog sees a biscuit, Morgan argued, the image thus impressed on the dog's mind immediately triggers associated expectations of smell and taste. The result is a perceptual construct in which the visual, olfactory and gustatory features of the biscuit so dominate that all other features are effectively eliminated. The dog's mind has executed abstraction-as-elimination, and the dog comes to believe that the biscuit is indeed 'good for eating'. But can a dog reflect on the quality of 'good for eating' in isolation, independently of an apparently good-for-eating object? Morgan's answer was negative. Abstraction-as-isolation was the privilege of human minds, because only humans had isolation-enabling language.¹³ 'By means of language and language alone has human thought become possible', wrote Morgan. 'This it is which has placed so enormous a gap between the mind of man and the mind of the dog... Through language has the higher abstract thought become possible.'¹⁴

The human monopoly over language and truly abstract concepts was a boon in all domains of knowledge save one. A science of the animal mind from the inside would never be possible, because, lacking language, animals would never be able to report on their own introspections. No animal could verify the 'ejective' inferences (that is, inferences based on human mental life) of the would-be animal psychologist, so no knowably reliable description of the animal mind could develop from those inferences. Worse, as Morgan wrote, 'such is the extraordinary complexity of the human mind – a complexity largely due to the use of language – that we may well suppose that any conception we can form of animal consciousness is exceedingly far from being a true conception'.¹⁵ Such considerations prompted extreme scepticism about animal minds. They had led Müller, notoriously, to declare (and here Morgan quoted Müller) that 'according to the strict rules of positive philosophy we have no right to assert or deny anything with respect to the minds of animals'. But, argued Morgan, such extremity was unwarranted so long as one accepted on other grounds that humans and other species were evolutionary kin. In Morgan's view, the evolutionist justifiably believed animals were conscious, because 'animals have inherited brain-structures in many respects similar to those possessed by man; and there is no reason for supposing that in them no psychoses [mental states] run parallel, or are identical, with their neuroses [brain states]'.¹⁶ So far as animals displayed

13 An almost identical analysis of language, abstraction, general ideas and animal minds can be found in the anthropologist C. S. Wake's *Chapters on Man, with the Outlines of a Science of Comparative Psychology*, London, 1868, 87–96. Wake was among the first writers to call the new science 'comparative psychology'. Wake, too, quoted Müller quoting Locke (34).

14 Morgan, op. cit. (11), 524. Morgan argued that while some animals had a kind of language, the confines of the animal mind limited animal communication to feelings and actions in the here-and-now. True language liberated its users from the tyranny of the present.

15 C. L. Morgan, 'Instinct', *Nature* (1884), 29, 370–5, 371.

16 C. L. Morgan, 'On the study of animal intelligence [1886]', *Mind* (1886), 11, 174–85, 177–8. The Müller quotation is from Müller, 'Philosophy', op. cit. (12), 211. As Morgan would later do, Müller here discussed several cases in which 'truly scientific observers' had discerned much more basic mechanisms behind putative reasoning in animals, notwithstanding 'those who think that philosophy may trust to anthropomorphic analogies, and that at least no counter arguments can be brought forward against their assertions that animals generalise, form concepts, and use them for the purpose of reasoning, exactly as we do'. Müller quoted his own anti-

associative learning, the evolutionist could even claim to know a little about the content of animal consciousness:

we may say that consciousness ... at a very early stage of evolution became, so to speak, polarised into pleasurable and painful; that those actions which were associated with pleasurable feelings were more frequently performed than those associated with painful feelings; that those organisms in which there was an association between right action and pleasurable feelings would stand a better chance of survival than those in which the association was between wrong actions and pleasurable feelings; and that finally those organisms in which conscious adjustments of all orders were more perfectly developed would be the winners in life's race.¹⁷

But to infer more than this about the minds of creatures in whom 'the ratio of the senses' was often very far from the human ratio was a hazardous business, like using 'mirrors of varying and unknown curvature' to study the heavens. A suitably cautious enquirer might glimpse in the human mind the mental vestiges of descent from the lower animals; but a true science of comparative psychology needed to be otherwise grounded. Like comparative anatomy, comparative psychology needed to deal as much as possible in publicly verifiable statements about observable structures. It needed to forgo Romanes's rich interpretations of animal behaviour in favour of systematic investigation and fact-gathering. 'Let us, therefore', Morgan urged, '... stick to the objective study of habits and activities, [of] reflex, instinctive and intelligent, making use of ejective inferences as sparingly as possible'.¹⁸

It was no mean feat for Morgan to bring Müller and evolutionism together thus. Müller was famously anti-Darwinian.¹⁹ For his part, Darwin ridiculed Müller's equation of language and reason.²⁰ Here the example of Morgan's former teacher Huxley was no doubt influential. In Huxley's view, as in Müller's, a 'gulf' intervened between the human mind and the minds of other creatures due to the 'power of language'. It was language alone which, in Huxley's words, 'enables men to be men – looking before and after and, in some dim sense, understanding the workings of this wondrous universe'. Unlike Müller, however, Huxley saw nothing in this language-based mental gulf that contradicted the Darwinian theory of evolution. Huxley argued that, for all its unprecedented power, language was nevertheless a function of the human brain; and the change in structure which occasioned so momentous a change in function need not itself have been

anthropomorphic credo in 'My reply to Mr. [George] Darwin', *Contemporary Review* (1875), 25, 305–26, 319, reprinted in Müller's *Chips from a German Workshop*, 2nd edn., 4 vols., London, 1875, iv, 433–72, 459 – the source that Morgan cites.

17 Morgan, op. cit. (15), 372; see also Morgan, op. cit. (16), 185.

18 Morgan, op. cit. (16), 179–80, 182.

19 In his 1861 *Lectures*, Müller wrote, 'Language is our Rubicon, and no brute will dare to cross it. This is our matter of fact answer to those who speak of development ... no process of natural selection will ever distill significant words out of the notes of birds or the cries of beasts'. Müller, 'Theoretical', op. cit. (12), 14–15.

20 In the *Descent of Man*, Darwin wrote, 'Max Müller gives in italics...the following aphorism: "There is no thought without words, as little as there are words without thought" What a strange definition must here be given to the word thought!' C. Darwin, *The Descent of Man, and Selection in Relation to Sex*, 2nd edn., London, 1874, 89 (Chapter 3, note 63). Müller's aphorism expressed a view of language with deep roots in German romanticism, in particular the work of Hamann, Herder, and Humboldt. See I. Hacking, 'How, why, when, and where did language go public?', *Common Knowledge* (1992), 1, 74–91.

momentous. The slightest variation in brain structure was all that was needed, putting language easily within the reach of natural selection, which required only such slight variations to build new species.²¹ In later life, Morgan recalled how he had once asked Huxley what distinguished his belief about this leap in mental evolution from the similar belief of the detested anti-Darwinian St George Jackson Mivart. According to Morgan's fragmentary notes, Huxley reached for 'speech and language' to clarify his position, insisting there was 'no evidence of *jump* either in laryngeal, mouth, or brain structure', that 'neuroses' and 'psychoses' were at all times tightly correlated, and that the 'child passes from animal stage to man stage *continuously*'. As with children, so with species: a process of continuous change at the level of structure brought discontinuous change – from mutism to speech – at the level of function.²²

A correspondence began to flow in the late 1880s between Morgan and the greatest Victorian sceptic about animal language and reason, Müller. In September 1887 Müller wrote to Morgan to thank him for his letter and (probably) a copy of Morgan's *The Springs of Conduct* (1885), the first chapter of which analysed the close links between language, concepts and the human mind. 'It is such a pleasure – as when travelling in a foreign country – to meet someone who speaks and understands one's own language', wrote Müller. 'As soon as I had read your letter, I recognized you as a countryman in philosophy – as one who had tramped the same tracts of thought, and was pushing to the same goal.' Müller went on to praise Morgan's discussion of abstraction and language.²³ The echo of at least one more letter (or perhaps a conversation) occurs in the pages of Morgan's first major scientific work, *Animal Life and Intelligence* (1890–1). Describing an experiment of Sir John Lubbock's, in which the removal of the leader from a group of ants had caused the rest of the group to turn back to the nest, Morgan added in a footnote, 'Professor Max Müller suggests to me that perhaps the ants were frightened.'²⁴

In *Animal Life and Intelligence* Morgan returned to the dog-and-biscuit example, affirming that, while the animal mind certainly had the power to construct a '*predominant*', that is, 'a perceptual construct with eatability predominant', the absence of language in animals put 'a conceptual isolate or abstract idea of eatability' beyond their mental grasp. Morgan added that 'this capacity of analysis, isolation, and abstraction constitutes in the possessor [i.e. in humans] a new mental departure, which we may describe as constituting

21 T. H. Huxley, *On the Origin of Species or, the Causes of the Phenomena of Organic Nature*, Ann Arbor, 1968, 140–3, 141, 142, 143 (originally published as *Our Knowledge of the Causes of the Phenomena of Nature*, 6 vols., London, 1862). See also T. H. Huxley, *Evidence as to Man's Place in Nature*, London, 1863, 102–3, 112; 'On the hypothesis that animals are automata, and its history', *Fortnightly Review* (1874), 16, 555–80, 574; *Hume*, London, 1881, 103–10. See D. Blitz, *Emergent Evolution: Qualitative Novelty and the Levels of Reality*, London, 1992, 36, for discussion of Huxley's argument in relation to his earlier and later saltationism.

22 C. L. Morgan, *Emergent Evolution*, London, 1923, p. vii (emphases in original). Morgan reported the conversation ending thus (p. viii): 'In conclusion, as [Huxley] answered a knock at the door, he dismissed a mere neophyte with the encouraging words: "You might well make all this a special field of enquiry."' On Huxley and Mivart, see Richards, op. cit. (6), 225–30, 354–7.

23 Letter from F. M. Müller to C. L. Morgan, 27 September 1887, in the Papers of C. Lloyd Morgan, 128/32, University of Bristol Library. For Morgan on language and abstract ideas, see C. L. Morgan, *The Springs of Conduct: An Essay in Evolution*, London, 1885, 14–15.

24 C. L. Morgan, *Animal Life and Intelligence*, London, 1890–1, 358.

not merely a specific, but a generic difference from lower mental activities'. He explained that he preferred the phrase 'generic difference' to the more familiar 'difference in kind' to signal his belief that novel features such as language and abstraction were none the less products of standard evolutionary processes (surveyed at length earlier in the book). So long as this evolutionary origin was granted, wrote Morgan, 'I am prepared to follow Professor Max Müller in his contention that language and thought, from the close of that [brute] stage onward, are practically inseparable, and have advanced hand-in-hand'.²⁵ His discussion of reason brought Morgan even closer to Müller's position. In Müller's 1887 book *The Science of Thought*, Müller had defined reason as 'neither more nor less than the faculty, or if we dislike that word, the act of handling abstract concepts'. (Müller's epigraph: 'No Reason without Language, No Language without Reason').²⁶ Now Morgan argued similarly that the term 'reason' ought to be reserved for that analytic, conceptual, isolating thought which language alone bestowed on its users:

I repeat, then, that the introduction of the process of analysis appears to me to constitute a new departure in psychological evolution; that the process differs generically from the process of perceptual construction on which it is grafted. And I hold that, this being so, we should mark the departure in every way that we can. I mark it by a restriction of the word 'intelligence' to the inferences formed in the field of perception; and the use of the word 'reason' when conceptual analysis supervenes. Whether I am justified in so doing, whether my usage is legitimate or not, I must leave others to decide. But, adopting this usage, I see no grounds for believing that the conduct of animals, wonderfully intelligent as it is, is, in any instances known to me, rational.²⁷

Across the ocean, around the same moment that Morgan penned these words, Garner was starting to do the research that would force a remarkable caveat onto this conclusion.

Animal language and animal reason: R. L. Garner

Morgan was a professional man of science and almost as much a professional philosopher. Garner was neither of these things. He grew up in south-western Virginia and north-eastern Tennessee, close to the Appalachian Mountains.²⁸ His education was not extensive, though it may have included some training in medicine. After the Civil War, the former Confederate soldier supported himself and his small family as a schoolteacher and an intermittently successful man of business. What Garner knew of evolution he probably learned from books, newspapers and magazines during the 'vogue of Spencer' that swept Gilded-Age America.²⁹ Press reports on the row between Müller and fellow Sanskritist William Dwight Whitney in 1875–6 carried Müller's already famous views to a much wider

²⁵ Morgan, op. cit. (24), 348–50, 376. Morgan reaffirmed (349) that he was 'prepared to say, with John Locke, that [such] abstraction "is an excellency which the faculties of brutes do by no means attain to"'.
²⁶ F. M. Müller, *The Science of Thought*, London, 1887, 200, title-page.

²⁷ Morgan, op. cit. (24), 373. In *Animal Life and Intelligence* Morgan also discussed *The Science of Thought* with respect to Müller's views on monism (467–72).

²⁸ For biographical information, see the entry for Garner in *The National Cyclopaedia of American Biography*, New York, 1906, xiii, 314.

²⁹ On the vogue of Spencer, see R. Hofstadter, *Social Darwinism in American Thought*, rev. edn., Boston, 1992, Chapter 2. On Darwinism in the American South of Garner's day, see R. L. Numbers, *Darwinism Comes to America*, London, 1998, Chapter 3.

popular audience,³⁰ and Garner later recalled Müller among several authorities he had read who insisted, in Müller's famous phrase, that language was 'the one great barrier between the brute and man'.³¹ In 1884 Garner's long doubts about this barrier were confirmed at the zoological garden in Cincinnati. He claimed that after listening for a while to the chatter of a group of monkeys he was able to predict the behaviour of a mandrill who shared their cage. Further translation proved elusive, however, and Garner soon abandoned the project.³² He turned his attention instead to the origins of writing, in particular to the enigma of the Maya glyphs, which he examined at the Smithsonian whenever business took him to Washington.³³ It was probably on one of these trips that Garner first saw in the ubiquitous cylinder phonograph a solution to his problems with the monkey language.³⁴ In 1891 Garner returned to the monkey houses, armed with a new scientific instrument.³⁵

The results of his phonographic research lifted the unknown Garner to immediate and international scientific celebrity. His claims were large. 'I am aware that it is heresy to doubt the dogmas of science as well as of some religious sects', wrote 'Professor' Garner in the first of a series of articles on 'The simian tongue', which appeared in the English *New Review* between June 1891 and February 1892,

but sustained by proofs too strong to be ignored, I am willing to incur the ridicule of the wise and the sneer of bigots, and assert that 'articulate speech' prevails among the lower primates, and that their speech contains the rudiments from which the tongues of mankind could easily develop; and to me it seems quite possible to find proofs to show that such is the origin of human speech.³⁶

30 A large sheaf of newspaper and magazine clippings on 'Whitney's controversy with Max Müller, 1875–76' is held in the Papers of W. D. Whitney, Group 555, Series 2, Box 53, Folder 53:064, Sterling Memorial Library, Yale University. On the Whitney–Müller debate, see D. Valone, 'Language, race and history: the origin of the Whitney–Müller debate and the transformation of the human sciences', *Journal of the History of the Behavioral Sciences* (1996), 32, 119–34.

31 R. L. Garner, 'Critics and croakers', unpublished MS, 1, in the Papers of R. L. Garner, Box 3, Folder: 'Writings: "Civilised savagery"—"Critics and croakers"', National Anthropological Archives, National Museum of Natural History, Smithsonian Institution (hereafter NAA/S). Garner reported once sending a letter to Müller challenging his views. 'Babies, born with speech instinct, have own language – Prof. Garner', *New York Evening Journal* (4 December 1919), clipping in the Garner Papers, Box 1, Folder: 'Newspaper clippings', NAA/S. The Müller quote is from Müller, 'Theoretical', op. cit. (12), 14.

32 R. L. Garner, 'The simian tongue [I]', *New Review* (1891), 4, 555–62, reprinted in Harris, op. cit. (12), 314–21, 314–15. Page references in what follows are to the Harris volume.

33 'Some new contributors', *Cosmopolitan* (1892), 13, 128. See also the letter from R. L. Garner to G. Brown Goode, 30 January 1888, RU 189, Box 43, Folder 7, Smithsonian Institution Archives (hereafter SIA).

34 'The phonograph has made more progress in Washington, in office and home-use, than in any other city thus far.' 'The Columbia Phonograph Co., Washington, D. C.', *The Phonogram* (April 1891), 1, 88–92, 89. On the history of the phonograph, see R. Gelatt, *The Fabulous Phonograph, 1877–1977*, 2nd rev. edn., London, 1977.

35 In November 1890 Garner sent a phonogram, proposing phonograph experiments with the monkeys at the new National Zoological Park, to the Park's acting director, Frank Baker. Letter from F. Baker to R. L. Garner, 8 December 1890, Papers from the National Zoological Park, 1887–1965, RU 74, Box 7, Folder 2: 'Correspondence, July 3, 1889–October 10, 1891', SIA. A notice about the success of these 'novel experiments with the phonograph' appeared in the April 1891 *Phonogram*, op. cit. (34), 85.

36 Garner, op. cit. (32), 314. A long and admiring notice of this article appeared in *The Spectator*. 'Apes and men', *The Spectator* (1891), 66, 787–8. The other articles in the series were 'The simian tongue [II]', *New Review* (1891), 5, 424–30, and 'The simian tongue [III]', *New Review* (1892), 6, 181–6. Both are reprinted in Harris, op. cit. (12), 321–7 and 327–32 respectively. Page references in what follows are to the Harris volume.

Garner used the phonograph for three basic tasks: first, to learn the sounds and meanings of simian utterances; second, to explore variation within the tongues of different species (for there were as many 'simian tongues' as there were ape and monkey species); and third, to compare these tongues and arrange them into a hierarchical series. For purposes of translation, Garner recorded the often rapid and, he claimed, subtly modulated utterances of the monkeys, and then repeated these, on the phonograph or, with lots of practice, on his own lips, and observed the effect of these sounds on other monkeys. Garner described how he had thus translated the Capuchin words for food, drink, sickness, storm and alarm. He also gave detailed instructions on how to pronounce these words (which turned out to be composed mostly of vowels).³⁷ An opportunity to go beyond translation and examine variation arose once at the zoological garden in New York's Central Park in December 1891. Garner was there doing experiments when a shipment of rhesus monkeys arrived from abroad. At Garner's request, the foreign monkeys were kept separate to ensure that no communication passed between them and the local rhesuses. When Garner recorded the local word for 'salutations' and repeated it to the new monkeys, their excited response showed, he believed, that the word was their word too.³⁸ Most important for Garner's evolutionary claims was the task of comparison. He argued that the whole of life could now be seen as a great chain of expression, with 'one unbroken outline, tangent to every circle of life from man to protozoa, in language, mind, and matter'.³⁹ For Garner, all creatures had the means for expression, commensurate with their physical and mental development generally – the expressive powers of mammals, for example, correlated closely with such features as the 'craniofacial angle' and the 'gnathic index' – and with the demands their mode of life placed on them.⁴⁰ Garner had discovered the language of spider monkeys to be 'almost as inferior to that of the brown Capuchin as the brown Capuchin's appears to be below the Chimpanzee's, and as the Chimpanzee's appears to be below the lowest order of human speech'.⁴¹

But were these simian languages really languages, much less ancestral to human languages? Garner justified his claims with a brief argument: 'To reason, [simians] *must think*, and if it be true that *man cannot think without words*, it must be true of monkeys: hence they must formulate those thoughts into words, and words are the natural exponents of thought.'⁴² It helps to distinguish three implicit and separate premises here. First, humans and monkeys are related. Second, evolution is uniformly progressive – features present in a later stage of the process are only more fully developed versions of features present at an earlier stage. Third, speech and reason always go together. This last Müllerian premise appears several times over in the argument above, and elsewhere in Garner's writings from this time, as 'speech is materialised thought' and 'words are the

37 Garner, op. cit. (32).

38 Garner, 'Simian [III]', op. cit. (36), 328–9.

39 Garner, op. cit. (32), 321.

40 'I think their speech, compared to their physical, mental, and social state, is in about the same relative condition as that of man by the same standard.' Garner, op. cit. (32), 320. On the craniofacial angle and gnathic index, see Garner, 'Simian [II]', op. cit. (36), 325.

41 Garner, 'Simian [III]', op. cit. (36), 331.

42 Garner, op. cit. (32), 320 (emphases in original).

body of which thoughts are the soul' (compare Müller's own 'the word is the thought incarnate').⁴³ In Garner's view, if humans and monkeys are related, if evolution is uniformly progressive and if speech and reason go together, then monkeys ought to speak and reason to a lesser degree than humans do. To Garner's satisfaction, at least, the phonograph showed he was right. He had found in the '*monophones*' of monkey speech, in which 'each idea seems to be couched in a single word of one syllable and nearly, indeed, of one letter', the homogeneous rudiments that later differentiated, first into the 'few score of words' and 'small range of sounds' of the tongues of savages and then into the fully heterogeneous tongues of the civilized races.⁴⁴ Where the most advanced humans used complex sounds to transmit complex ideas between complex minds, monkeys used simple sounds to transmit simple ideas between simple minds; but for each group words served the same basic function. Simian words were no different in kind from human words.⁴⁵

Garner conducted almost all his experimental work in the United States with captive monkeys. To test his claims about the intermediate regions of the chain of language, he decided on a bold course of action. 'I am now trying to arrange for a trip to interior Africa to visit the *trogodytes* in their native wilds', Garner wrote in November 1891, 'and if my plans (which are all practicable) can be arranged, I agree to give to the world a revelation which will rattle the dry bones of philology in a wholly new light'. He added that the inventor of the phonograph, Thomas Edison, was helping to modify his invention – 'the only thing which makes these researches possible' – for the upcoming expedition.⁴⁶ More details appeared in December in an article in *Harper's Weekly* on Garner's Central Park experiments. Readers learned that a seven-foot-square cage made of metal bars would be Garner's forest home, in which he would sit with phonograph and camera to obtain a full record of the speech and habits of gorillas and chimpanzees in the wild. 'Granted that I have got to the bottom of monkey talk, my task would be but half accomplished', Garner told the *Harper's* reporter. 'I have but forged a single link in the chain. I want another. I propose taking down the speech of the lowest specimens of the human race – the pygmies, the Bushmen ... the Hottentot cluck and click.' The reporter added,

There was something grewsome [*sic*] in a surmise like this – the further pinning down of humanity to his anthropoidal apish origin; but it was not said in any airyish or irreverent manner. Then somebody who wanted to flaunt his erudition said: 'And what's to become of the Max Müller business about Sanskrit?' ... It all seems like a Jules Verne excursion into the animal kingdom; but with a man as a directing spirit who will go to Africa, taking with him all those scientific implements which have positive and practical effectiveness, much may be expected. No one can know what Mr. Garner may not accomplish. He may advance only by one footprint into the realm of the long past, where all has been heretofore hazy, confused, indistinct. Certainly he is a brave man who has the courage to try and solve nature's greatest mystery.⁴⁷

43 Garner's variants on Müller's maxim appear in Garner, 'Simian [II]', op. cit. (36), 327. Müller's own variant appears in Müller, 'Theoretical', op. cit. (12), 35.

44 On savage and civilized tongues, see Garner, op. cit. (32), 320; on simian monophones, see Garner, 'Simian [II]', op. cit. (36), 326 (emphasis in original).

45 Garner, op. cit. (32), 320; and 'Simian [II]', op. cit. (36), 327.

46 Garner, 'Simian [II]', op. cit. (36), 325 (emphasis in original). The collaboration with Edison developed throughout 1891–2, and resulted in plans (apparently never realized) for a phonograph with a kind of telephone attached, into which the monkeys would unwittingly speak. Garner described the instrument in R. L. Garner, 'A monkey's academy in Africa', *New Review* (1892), 7, 282–92, 285–6.

47 B. Phillips, 'A record of monkey talk', *Harper's Weekly* (1891), 35, 1050.

In the summer of 1892, around the time he left New York for England and the Congo, Garner's book *The Speech of Monkeys* appeared. Throughout he appealed to Müller's word-thought maxim, in metaphors often as high-flown as Müller's own: speech was 'the natural issue of thought'; it was 'the physical manifestation of which thought is the force'; it was 'a spoke in the chariot-wheels of consciousness'. But Garner also insisted that, whatever became of the dispute between 'Prof. Max Müller and Prof. Whitney, the great giants of comparative philology', over the relations between language and thought, monkey language and monkey thought were now experimentally attested facts. Garner's phonograph experiments were the future of comparative psychology. 'Their speech is the only gateway to their minds', he wrote of the monkeys, 'and through it we must pass if we would learn their secret thoughts and measure the distance from mind to mind'. Even without the phonograph, much had already been learned about the mental powers of monkeys. On the basis of a number of psychological experiments, Garner claimed to show that monkeys had ideas of number, colour, and quantity, ideas abstract at least 'in the feeblest degree'. Furthermore, he reported observations showing that monkeys exercise reason – for Garner, the power 'to think methodically and to judge from attending facts'. To test for reason in animals, in Garner's view, one needed to put the animals on their own resources under novel circumstances. A monkey who figured out how to escape from its cage was exercising reason no different in kind from human reason. Wherever reason began in the scale of nature, Garner concluded, 'it is somewhere far below the plane occupied by the monkeys'.⁴⁸

When Morgan's canon met Garner's phonograph

Garner arrived in England in late July 1892. Shortly thereafter, he was invited to speak at the meeting of the British Association for the Advancement of Science in Edinburgh; and it was in Edinburgh, in the first week of August, that the paths of Morgan's canon and Garner's phonograph first crossed.⁴⁹ There is no evidence that the men behind the methods ever met. On the morning of 4 August Garner presented himself in the rooms of the anthropological section, only to learn that his address on monkey language had been scheduled not for that day (Thursday) but for the following Monday. Garner explained that he was not able to wait due to prior engagements. He offered to leave his paper for discussion in his absence, but the section officials refused, and Garner returned to London paper-in-hand. His name remained on the programme, however, and a large crowd gathered on Monday to hear him speak. When he failed to show, suspicions were aroused.⁵⁰ Garner

48 R. L. Garner, *The Speech of Monkeys*, London and New York, 1892, 171, 189, 205, 110, 32–3, 158–9. On monkey reason and how to test for it, see especially Chapter 16.

49 On Garner's invitation, see R. L. Garner, 'Mr. Garner and the language of monkeys', *The Times*, 25 August 1892, 5.

50 Garner, op. cit. (49). In the *Journal of Sectional Proceedings* no. 5 (Monday 8 August 1892), Garner's name and lecture title appear in the third slot for the 11 a.m. meeting of the section. Papers of the British Association for the Advancement of Science, Dep. BAAS 179, Annual meeting – Edinburgh 1892, Bodleian Library, University of Oxford. See also *Natural Science* (1892), 1, 495.

defended his reputation in an angry letter to *The Times* a few weeks later. ‘I only consented to read the paper with the desire to aid in the laudable work of that great school of science known all over the earth’, he protested. ‘And I fully appreciated the honour of appearing before it, and deny any want of respect for that august body.’⁵¹ The London correspondent of the *New York Times* blamed Garner’s treatment at the hands of the officials on his ‘being a plain, unpretentious, practical worker instead of a dry, polished plant’, adding that, after his letter appeared, Garner had received ‘a large number of expressions of regret and annoyance from British men of science’.⁵² Garner stayed in England through the rest of the summer, preparing for the voyage and carrying out psychological experiments with an orang-utan in Regent’s Park.⁵³ In mid-September he boarded a steamer at Liverpool, bound for the Congo.⁵⁴

The day after Garner’s frustrated negotiations in Edinburgh, Morgan gave a paper before the zoological section.⁵⁵ He had argued the main points a few days earlier in London, at the Second International Congress of Experimental Psychology, where he had introduced his new rule of method.⁵⁶ The old argument for a language–reason gulf between brute and man was now recast along the lines set out in fellow evolutionist William James’s *Principles of Psychology*, published around the same time as Morgan’s own *Animal Life and Intelligence*.⁵⁷ Altering slightly James’s famous ‘stream’ metaphor, Morgan now spoke of a ‘wave of consciousness’, with its crest of full or ‘focal’ consciousness, and its trough of ‘marginal’ consciousness. He argued that what James had called a ‘fringe of relation’ surrounds each object that we humans apprehend in the course of ‘the simple psychical life of external perception’. As we turn our attention from object to object, the relations between objects – spatial relations, relations of similarity and dissimilarity, and so on – fleetingly register at the margins of consciousness. For Morgan, this ‘feeling or sensing of relations’ was crucial to practical skills in humans and animals alike. But he insisted on ‘a great difference in practical experience between a relation dimly felt and a relation perceived or cognized’. To focus consciousness on relations themselves seemed to require the use of introspection and reflection; and there was no evidence that these were available to animals.⁵⁸ The new distinction between awareness of relations and perception of relations mapped neatly onto the old distinction between perceptual

51 Garner, op. cit. (49).

52 (H. Fredericson), ‘Letter from Britain’, *New York Times*, 28 August 1892, 5.

53 R. L. Garner, ‘A mission to the monkeys: Prof. Garner’s experiments and his plans’, *New York Times*, 25 September 1892, 17.

54 Letter from R. L. Garner to H. Garner, 28 September 1892, Garner Papers, Box 1, Folder: ‘Outgoing letters’, NAA/SI.

55 C. L. Morgan, ‘The method of comparative psychology’, in the *Report of the British Association for the Advancement of Science*, London, 1893, 754–5.

56 Morgan, op. cit. (1). See also Richards, op. cit. (6), 381, note 156.

57 See W. James, *The Principles of Psychology*, 2 vols., New York, 1890, i, Chapter 9 (on ‘The stream of thought’) and ii, Chapter 22 (on ‘Reasoning’, including ‘the intellectual contrast between brute and man’); and *Psychology: A Briefer Course*, London, 1892, in which the ‘stream of thought’ became (Chapter 11) the ‘stream of consciousness’. Morgan reviewed both works for *Nature*, in April 1891 and May 1892 respectively. See *Nature* (1891), 43, 506–9, and (1892), 46, 1–4. On James and comparative psychology, see Boakes, op. cit. (5), 66.

58 Morgan, op. cit. (1), 44–7.

construction and conceptual isolation. As before, in Morgan's words at Edinburgh, 'it is well to restrict the words "reason" and "rational"' to the higher and exclusively human process. 'Animals', he affirmed, 'are certainly intelligent; they may be rational'.⁵⁹ The retention as well of a key role for language was signalled in a letter Morgan published in *Nature* a few weeks after the British Association meeting, at the beginning of September:

The power of cognizing relations, reflection and introspection, appear to me to mark a new departure in evolution. But whether, as I am at present disposed to hold, the departure took place through the aid of language coincident with, or subsequent to, the human phase of evolution; or whether, as other observers and thinkers believe, it took place, or is now taking place, in the lower mammalia or in other animals, is a matter for calm, temperate and impartial discussion founded on accurate, and, as far as possible, crucial experiment and observation.⁶⁰

Who were these 'other observers and thinkers'? The appearance in *Nature* later that month of Morgan's review of *The Speech of Monkeys* suggests that Garner was among them. In his review Morgan deplored the 'anecdotal style' of the book. Too many of its claims, he wrote, 'savoured of the prattle of the parlour tea-table rather than the sober discussion of the study'. When Garner stated, for example, that 'all mammals reason by the same means and to the same end, but not to the same degree', and that it was only the 'siren-voice of self-conceit' which kept men from admitting this truth, he showed, in Morgan's judgement, his utter lack of sound training in psychology. Only through such training would Garner gain 'the right of expressing a scientific opinion on this difficult question'. Morgan argued further that Garner's results showed monkeys to have more modest mental equipment than Garner claimed for them. The elements of the simian tongue were no more impressive than the chick sounds Morgan himself had recently been investigating. Morgan reported that within their first week baby chicks commanded a five-sound repertoire: a 'cheep' of contentment, a 'churr' of danger, and so on. He allowed that these sounds were intentionally emitted by the chicks, and conveyed to fellow chicks some kind of 'intimation', sometimes of an inner emotional state, sometimes of an external object. In Morgan's view, Garner's detailed record of his difficulties in translating monkey words showed that these too lacked more than the most general 'suggestive value'. The Capuchin word for food, for example, seemed 'mainly expressive of a craving for something'. The rest of the simian tongue appeared likewise 'emotional in [its] nature'. However ineptly, Garner was nevertheless, in Morgan's judgement, 'working on the right lines, namely, those of experiment and observation in close contact with phenomena', and he wished the traveller to the apes 'all success in the prosecution of his inquiry'.⁶¹

Meanwhile, with Garner abroad, Morgan carried on with his own experiments and observations. The chick experiments he reported in his 1893 paper on 'The limits of animal intelligence' showed how mere trial-and-error intelligence, 'ever on the watch for fortunate variations of activity and happy hits of motor response', could generate effects which, to the casual observer, gave the appearance of reasoned action, derived from 'a

⁵⁹ Morgan, op. cit. (55), 755.

⁶⁰ C. L. Morgan, 'The limits of animal intelligence', *Nature* (1892), 46, 417.

⁶¹ C. L. Morgan, Review of R. L. Garner's *The Speech of Monkeys*, *Nature* (1892), 46, 509–10.

clear perception of the relationships involved'.⁶² But for all the evidence of the sufficiency of associative learning, Morgan nevertheless concluded the paper, in the middle of 1893, with the remarkable caveat to which I drew attention earlier (and behind which I detect the impending return of Garner, laden with phonograph cylinders). As we have seen, Morgan had staked his reform of comparative psychology on the twinned absences of animal language and animal reason. If gorillas and chimpanzees in the wild turned out to have languages not far removed from savage tongues, the case for that reform would collapse. With his 1893 caveat, Morgan tried to salvage his conceptual distinctions, whatever the fate of his claims about animal reason. Not long after the publication of the 1893 paper, while Morgan was finishing work on his textbook, *An Introduction to Comparative Psychology*, he took the further step of reformulating his case for reform entirely, so that his new rule now appeared wholly unconnected to his views on animal language and animal reason.

The 1894 *Introduction* brought Morgan's 'canon of interpretation' (as he now called it) before a much wider audience.⁶³ After stating the canon, Morgan distinguished three views of evolution, linked to three interpretative 'methods'. According to Morgan, if evolution always adds higher mental faculties to lower ones while holding the lower ones constant, then the right interpretative method is the 'method of levels', according to which, as Morgan put it, 'the dog is just like me, without my higher faculties'. If evolution only increases the representation of faculties present in the same ratio in all creatures, then the right method is the 'method of uniform reduction', according to which 'the dog is just like me, only nowise so highly developed'. But if evolution has a free hand both to add genuinely new higher faculties and to tailor the ratio of already present lower faculties, then the right method was the 'method of variation', according to which the dog may not be much like a human at all. 'Of the three methods', wrote Morgan, 'the method of variation is the least anthropomorphic, and therefore the most difficult'. This least anthropomorphic and most difficult method of interpretation was the method promoted in Morgan's canon. The canon was needed, in sum, not because there was (as there had once been) a prima-facie case for the absence of animal reason, nor because the simpler explanation was more likely to be the true explanation – Morgan noted that the hypothesis of animal reason often led to more parsimonious explanations of animal behaviour – but because evolution had the power to shape animal minds without constraint.⁶⁴ Yet Morgan offered no grounds whatsoever for believing that evolution wielded such power (the power to keep animal minds from being remotely like human minds). At the close of the

⁶² Morgan, op. cit. (8), 239.

⁶³ Morgan refers to the canon thus in C. L. Morgan, *An Introduction to Comparative Psychology*, London, 1894, 287, 377.

⁶⁴ Morgan, op. cit. (63), 54–9; see 54–5 on the greater parsimony of explanations of animal behaviour in terms of reasonable inference, and on some of the cases in which (55) 'the simplest explanation is not the one accepted by science'. Curiously, Richards and Boakes attribute to Morgan a rather different evolutionary argument: that natural selection will never favour more complex mental processes if simpler mental processes will suffice to adapt creatures to their conditions of life. See Boakes, op. cit. (5), 40; Richards, op. cit. (6), 395. This is an argument for the canon based on the limits of the power of evolution – an interesting argument, but not, it seems to me, Morgan's own.

Introduction, he admitted his case for the canon had thus left him vulnerable to charges of dogmatism.⁶⁵

Although Morgan now presented his canon without reference to animal language or reason, elsewhere in the book he argued for three basic levels of mental development and three basic levels of linguistic development in animals.⁶⁶ At the bottom level were the brutes, who, mired in the world of sense experience, had little to communicate about beyond their own emotional states and the relation-fringed objects fitfully carried on the waves of consciousness. Morgan praised 'Mr. R. L. Garner[']s ... pioneer work' with the phonograph and monkeys in helping to establish that such 'indicative communication' went together with mere awareness of relations. Above the brutes, on the middle level, were those vanished proto-humans among whom 'descriptive intercommunication' went together with the perception of relations. At the top were modern humans, among whom 'explanatory intercommunication' went together with the conception of relations. Only here could reason emerge, for 'that being alone is rational who is able to focus the *therefore*'.⁶⁷ Once again, and just as Müller had taught, language and reason were intimately bound, and exclusively human; but now the language–reason gap yawned wide enough to swallow anything Garner might discover in the Congo. Even if the apes proved to have powers of description, and so proved to perceive relations, Morgan had made it clear that such proof would not itself count as evidence for ape reason.

The canonization of comparative psychology

In the end Garner's challenge to Morgan foundered independently of Morgan's intellectual manoeuvring. Garner failed to secure permission from the notoriously shady phonograph concern in Britain to take any phonographs at all with him to the Congo, let alone phonographs modified for his purposes.⁶⁸ A dejected Garner wrote to Edison from Libreville on 4 November 1892 that without this instrument 'I am thus obliged to omit one of the very most important features of my work'.⁶⁹ Worse was to come. When Garner returned to Britain a year later and, in the winter of 1894, began to lecture about his experiences, he found himself accused of fraud. The charges came from Henry Labouchère, a well-known journalist and politician.⁷⁰ In the pages of *Truth*, the inexpensive weekly of

⁶⁵ Morgan, op. cit. (63), 377. See E. Sober, 'Morgan's canon', in *The Evolution of Mind* (ed. D. D. Cummins and C. Allen), Oxford, 1998, 224–42, for a critique of the 1894 justification from the perspective of modern evolutionary biology and probabilistic inference. Sober seeks to put Morgan's canon on firmer foundations. Jerry Fodor recommends rejecting the canon altogether. See J. Fodor, 'Not so clever Hans', *London Review of Books* (4 February 1999), 12–13.

⁶⁶ Cf. the much simpler views in Morgan, op. cit. (24), 374–6.

⁶⁷ Morgan, op. cit. (63), 241–304, 246, 283.

⁶⁸ (Fredericson), op. cit. (52).

⁶⁹ Letter from R. L. Garner to T. A. Edison, 4 November 1892, in the Papers of Thomas A. Edison (microfilm edn.), Part 3, Reel 133, Frames 336–8, 338.

⁷⁰ For biographical information, see the entry on Labouchère in the *Dictionary of National Biography: 1912–1921*, (ed. H. W. C. Davis and J. R. H. Weaver), Oxford, 1927, 316–18.

which he was editor, Labouchère confessed himself less interested in ‘what gorillas have to say for themselves, and how they say it’, than in whether Garner had really spent any time at all among the apes.⁷¹

Labouchère urged the Professor to act quickly in setting the record straight as to just when and where he had occupied his famous cage, and for how long. When Garner arrived in the United States in March 1894, to front-page acclaim in the *New York Times*, a vigorous campaign to discredit him was well under way.⁷² Garner did not publish his memoir of the Congo journey, *Gorillas and Chimpanzees*, until 1896, by which time his reputation was in tatters.⁷³ During the tenacious and often comic pursuit of *Truth*, Garner had been denounced as a liar, a coward, a drunk, a freeloader and a fool, ‘the Munchausen of Monkey-land’ who had tried to palm off ‘a ridiculous farrago of twaddle’, and who had whiled away his time not in a cage in the forest but in a room at a Catholic mission, eating the Fathers’ food and drinking their claret (several bottles at a sitting).⁷⁴

The truth or otherwise of *Truth’s* allegations are not concerns for the present paper. What matters are the consequences of those allegations: the virtual disappearance of Garner, his method and his claims from comparative psychology.⁷⁵ Not that Garner himself disappeared from public view. After the first, disastrous expedition to the Congo, Garner returned many times, sometimes as an animal collector for institutions such as the Smithsonian and the New York Zoological Society. He remained well known throughout the rest of his life as an authority on primates. But neither he nor his work ever again commanded the attention of professional science,⁷⁶ though Morgan continued for some time after the scandal to cite and defend ‘Max Müller’s dictum that “the one great barrier between the brute and man is language”’ against the claims of Garner and others.⁷⁷ In *Animal Behaviour* (1900) Morgan argued that the

animal ‘word’, if we like so to term it, is an isolated brick; a dozen, or even a couple of hundred such bricks do not constitute a building. Language, properly so called, is the builded structure, be it a palace or only a cottage; hen language, or monkey language, is, at best, so far as we at present have evidence, an unfashioned heap of bricks. It is just because language is the expression of a portion of a scheme of thought that it indicates in the speaker the possession of a rational

71 [H. Labouchère], ‘A few questions for Professor Garner’, *Truth* (1894), 35, 480–1, 480.

72 ‘Thinks well of gorillas: Prof. Richard L. Garner tells of his life in a cage’, *New York Times*, 26 March 1894, 1.

73 R. L. Garner, *Gorillas and Chimpanzees*, London, 1896.

74 [H. Labouchère], ‘Garner’s unpaid bill’, *Truth*, 27 December 1894, 36, 1513–14, 1514; and ‘The Munchausen of Monkey-land’, *Truth*, 12 November 1896, 40, 1232–3, 1232. A summary of press accounts of the scandal can be found in E. P. Evans, *Evolutional Ethics and Animal Psychology*, London, 1897, 330–2.

75 The scandal also gave Jules Verne the beginnings of a novel. J. Verne, *The Village in the Treetops*, (trans. I. O. Evans), London, 1964, originally published in 1901 as *Le Village Aérien*. The story centres on the search for Dr Johausen, who had journeyed into the Congo interior with a Garneresque cage to finish the job Garner had botched.

76 See R. M. Seyfarth, D. L. Cheney and P. Marler, ‘Monkey responses to three different alarm calls: evidence of predator classification and semantic communication’, *Science* (1980), 210, 801–3, for a description of now classic work among the vervet monkeys of Kenya, using playback experiments much like those pioneered by Garner. Dorothy Cheney recently told me she had never before heard of Garner or his work.

77 C. L. Morgan, *Animal Behaviour*, London, 1900, 198, 204. See also Morgan’s unpublished paper on ‘The beginnings of speech’, Morgan Papers, DM 612, University of Bristol Library, 1–3, 9, 14, 17.

soul, capable of perceiving and symbolizing the relationships of things as reflected in thought ... And though there is no conclusive evidence of its occurrence among animals, yet we have in them the instinctive and intelligent basis on which in due course of evolution it may securely be based.⁷⁸

While scandal ate away at the credibility of Garner and his claims, Morgan's vision of a reformed comparative psychology enjoyed increasing success and influence. One notable convert to the cause was the young Edward Thorndike. Shortly after Morgan gave the prestigious Lowell Lectures at Harvard in January 1896, the Harvard student entered on a landmark programme of research into the animal mind.⁷⁹ In Thorndike's famous 'puzzle boxes' – crates with doors which the animals learned to open – Morgan's canon found belated instrumental embodiment. Using the puzzle boxes, Thorndike was able for the first time to quantify the exercise of 'intelligence' in Morgan's sense, by plotting the solution time for consecutive trials, thus creating the soon ubiquitous learning curve.⁸⁰

Thorndike's work set the tone for much of the animal research to follow in the new psychology departments of the United States.⁸¹ By the turn of the century the victory of Morgan's canon over Garner's phonograph was virtually complete. After the appearance in 1908 of Margaret Floy Washburn's *The Animal Mind*, generations of students learned as uncontroversial fact, on their way to induction into the new puzzle-box regime, that 'animals have no language in which to describe their experience to us'. More was the pity, added Washburn, for 'the higher vertebrates could give us much insight into their minds if only they could speak'.⁸² The possibility that such insight might be there for the taking (or rather the hearing) through assiduous experimental work with the phonograph was no longer even raised. Morgan's canon would be the guide. Following it was 'like tipping a boat in one direction to compensate for the fact that someone is pulling the opposite gunwale', for the 'social consciousness of man is very strong, and his tendency to think of other creatures, even of inanimate nature, as sharing his own thoughts and feelings, has shown itself in his past to be almost irresistible'. Washburn concluded thus: 'Lloyd Morgan's canon offers the best safeguard against this natural inclination, short of abandoning all attempt to study the mental life of the lower animals.'⁸³

Conclusion

The canonization of comparative psychology has made it hard to see how comparative psychology could have developed in any other way. From Morgan's own point of view, however, there was nothing inevitable about the triumph of his canon. His 1893 caveat and

⁷⁸ Morgan, op. cit. (77), 205.

⁷⁹ On Morgan's influence on Thorndike, see Boakes, op. cit. (5), 68–9. On Morgan's influence generally, see Richards, op. cit. (6), 385.

⁸⁰ E. L. Thorndike, 'Animal intelligence: an experimental study of the associative processes in animals', *Psychological Review* (1898), 2, 1–109. Although Thorndike endorsed the low estimate of the animal mind enjoined by Morgan's canon, he dissented from Morgan's view about the relative importance of language to mental advance (83). See also Boakes, op. cit. (5), 72.

⁸¹ See Boakes, op. cit. (5), 70–8.

⁸² M. F. Washburn, *The Animal Mind: A Textbook of Comparative Psychology*, New York, 1908, 3.

⁸³ Washburn, op. cit. (82), 25–6.

1894 justification switch recall a moment of remarkable instability. To make sense of that moment, I have tried to restore Morgan's own understanding of the need for the canon. Behind Morgan's canon lies not a general, timeless desire to keep science free from illusion, but a specifically Victorian diagnosis of what makes the human mind different from the minds of other species. Throughout the 1880s and early 1890s Morgan's case for a reformed comparative psychology rested squarely on Müller's insistence that language, reason and humankind were coextensive.⁸⁴ The grip of Müller's views on Morgan remained firm through the subsequent Jamesian turn in his thought and the introduction of the new rule of method in August 1892.⁸⁵ In Morgan's view, the canon was needed because species without language were probably shut out from reason. Hence the 1893 caveat and the 1894 justification switch, precipitated, I have argued, by Garner's phonographic expedition to the Congo in 1892–3. If Garner turned out to be right about animals having language, then Morgan was wrong about animals lacking reason, and his new rule would be stillborn.

The chronicle of events offered here is new; but the pairing of Garner and Morgan is not. William James put the two together in the early 1890s. I refer to a single page of James's *Principles of Psychology*. In a footnote at the bottom of the page, James refers the reader to Morgan 'on the possible fallacies in interpreting animals' minds'. In the text above is the following sentence: 'Man is known again as "the talking animal"; and language is assuredly a capital distinction between man and brute.' In his own copy of the book, James inked in a note: 'Cf. R. L. Garner, the Simian Tongue, (New Review, June 1891).'⁸⁶ Much

84 I have presented Morgan as arguing throughout the 1880s for a comparative psychology with radically deflated ambitions. Other historians detect a major divide in Morgan's thought during this period. In their view, Morgan first argued that comparative psychology was impossible, then, perhaps on becoming a monist, reversed himself and argued that it was possible after all. See Richards, op. cit. (6), 380; Costall, op. cit. (7), 119. Let me mention three problems with this view. First, the sole witness to this supposed shift towards Romanes was Romanes – hardly a neutral Morgan watcher. Second, Morgan never denied that comparative psychology of any sort was possible. What he denied was that Romanes's kind of comparative psychology was objective. Third, it was not the strong thesis of monism, or neurosis–psychosis identity, which anchored Morgan's belief that animals had minds, but the much weaker theses of neurosis–psychosis parallelism and evolutionary kinship between humans and animals – both of which Morgan publicly backed in the same 1884 paper in which he pronounced comparative psychology 'impossible'.

85 What Costall (op. cit. (7)) describes as Morgan's embrace of Romanesian anthropomorphism would much more accurately be described as an embrace of Jamesian introspectionism. It was as if James the brilliant writer had climbed into his own head and come back with descriptions of the mental gulf Morgan knew to be there from the start. As for Morgan's adoption from James of the 'stream of consciousness' and the 'feeling versus perception of relations' themes, I should add that neither was original to James. Morgan had encountered both themes earlier: the former in William Clifford's work; the latter in Herbert Spencer's. On Clifford, Morgan, James, and the 'stream' theme, see Richards, op. cit. (6), 378. On Morgan's reading of Spencer in the 1880s, see Morgan, op. cit. (9), 247. For Spencer on relations, see H. Spencer, *The Principles of Psychology*, 2 vols., London, 1870, i, Part 2 and ii, Part 6. Nevertheless, it was Morgan's reading of James around 1891 that pushed these themes to the centre of Morgan's thinking. In his preface to his *Introduction*, Morgan wrote of his 'indebtedness to the work of Herbert Spencer, whose description of relations as "the momentary feelings accompanying transitions"' in consciousness contains the germinal idea from which my own thinking ... has developed'. But James quoted exactly the same passage (favourably) in his *Principles*. See Morgan, op. cit. (63), p. x; James, *Principles*, op. cit. (57), i, 242; Spencer, *Principles*, op. cit. (above), i, 64.

86 W. James, *Principles*, op. cit. (57), i, 355–6. The Garner note is printed in W. James, *The Principles of Psychology*, 3 vols., Cambridge (MA), 1981, iii, 1470.

later than James, the neurologist MacDonald Critchley also put Garner and Morgan together – and with Müller as well. Here is Critchley lecturing on ‘the nature of animal communication and its relation to language in man’ in London in 1958:

Differences between the communicative systems of *homo sapiens* and the sub-hominids could be looked upon as matters of fundamental quality, or merely a question of degree ... Müller was the most eloquent champion of [the theist version of the former] ... in the [latter] camp there is ranged a considerable body of biological opinion, even though few today would associate themselves with Garner, who argued that monkeys are endowed with a vocal system which discharges all the functions of speech. His view may be looked upon as an extreme example of anthropomorphic interpretation of animal behaviour. To attach a plausible explanation to a complicated pattern of behaviour on the part of a bird or mammal, is only too seductive, and the temptation should always be offset by applying the ‘canon of minimum antecedent’. Lloyd Morgan emphasized that an animal’s activity should never be interpreted in terms of higher psychological processes if it can be fairly explained by processes which are lower in the scale of psychological evolution and development. In other words we must always seek the ‘minimum’ explanation of animal behaviour. The canon should also be applied to any too humanistic interpretation of sounds emitted by animals.⁸⁷

By the mid-twentieth century, as Critchley’s remarks show, Morgan’s canon had become obvious. It no longer needed justification at all. The minimum, non-anthropomorphic explanation of animal behaviour was just what objectivity demanded. Accordingly, Garner’s work, all but forgotten, had become a fine example of bad scientific method. Garner, Critchley suggested, was what comparative psychology became when people failed to heed Morgan’s canon. He was more right than he knew.

⁸⁷ M. Critchley, *Aphasiology and Other Aspects of Language*, London, 1970, 126–43, 132–3.