

Where Were the Counting Crows?

Richard Shedenhelm

In his recent article, "Ayn Rand and the Cognitive Revolution in Psychology," Robert Campbell assesses some of the significant ties of Rand's work to the research into the limited capacity of consciousness going on during the 1950's and 1960's (Campbell 1999, 109–13). Specifically, Campbell discusses the experiment Rand cites at the beginning of chapter seven of her *Introduction to Objectivist Epistemology*:

The story of the following experiment was told in a university classroom by a professor of psychology. I cannot vouch for the validity of the specific numerical conclusions drawn from it, since I could not check it first-hand. But I shall cite it here, because it is the most illuminating way to illustrate a certain fundamental aspect of consciousness—of any consciousness, animal or human.

The experiment was conducted to ascertain the extent of the ability of birds to deal with numbers. A hidden observer watched the behavior of a flock of crows gathered in a clearing of the woods. When a man came into the clearing and went on into the woods, the crows hid in the tree tops and would not come out until he returned and left the way he had come. When three men went into the woods and only two returned, the crows would not come out: they waited until the third one had left. But when five men went into the woods and only four returned, the crows came out of hiding. Apparently, their power of discrimination did not extend beyond three units—and their perceptual-mathemati-

cal ability consisted of a sequence such as: one-two-three-many. (Rand 1990, 62)

Who is the source of this experiment?¹ When I ask others this question, I usually get at least one of the following answers: 1) the principle dramatized in the case of the crows, *subitizing*, is the same as the famous Miller article "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information," (Miller 1956)—so maybe the crow example is cited there; 2) Otto Koehler performed experiments on birds in the 1940's, so the example probably comes from his work. Though the second answer is more plausible than the first, they are both incorrect. The Miller article discusses various lines of evidence indicating the limited human capacity to assimilate information, but it does not mention any experiments concerning animals' ability to subitize. Although Koehler experimented on crows, his work was confined to the indoor laboratory and did not include observations made in the wild (Koehler 1956).^{2, 3}

We can find a more plausible source for the experiment Rand cites in Levi Conant's *The Number Concept*.

In connection with the assertion that the idea of number seems to be understood by the higher orders of animals, the following brief quotation from a paper by Sir John Lubbock may not be out of place: "Leroy . . . mentions a case in which a man was anxious to shoot a crow. To deceive this suspicious bird, the plan was hit upon of sending two men to the watch house, one of whom passed on, while the other remained; but the crow counted and kept her distance. The next day three went, and again she perceived that only two retired. In fine, it was found necessary to send five or six men to the watch house to put her out in her calculation. The crow, thinking that this number of men had passed by, lost no time in returning." From this he inferred that crows could count up to four.⁴ (Conant 1896, 3-4; 1956, 433)

According to James Newman, "Conant was for many years professor of mathematics at the Worcester Polytechnic Institute, and from 1911-1913 its acting president. He was the author of numerous mathematics texts and active as an educationalist" (430). *The Number Concept*—a book described by Wilder as "Conant's classical work"—seems to have been very influential this century in the study of the anthropological development of mathematics (Wilder 1968, 33-34).⁵

So, who is the "Leroy" quoted by Sir Lubbock? Charles-Georges Leroy (1723-1789) succeeded his father as lieutenant of hunting fields and in the administration of the forests and parks of Versailles and Marly, a position that allowed him much occasion for observing animal behavior. He wrote a series of published letters addressed to an intimate lady, Madame d'Angivillier, that criticize the view of animals being mere machines through empirical accounts both of animal and human behavior. In this approach, he was extending the theories of Condillac and La Mettrie (Warden 1927, 144; Peters 1965, 526; Gray 1968, 377). Due to the civil and religious intolerance of the time, his letters had to be published anonymously or under the pseudonym, *The Naturalist of Nuremberg*.⁶ One of the letters appeared anonymously as the entry "instinct" in Diderot's *Encyclopédie*. In it, he writes the following:

Among the various ideas which necessity adds to the experience of animals, that of number must not be overlooked. They count, that is certain; and though, up to the present time, their arithmetic appears weak, perhaps it may be possible to strengthen it. In those countries in which game is much preserved, crows are made war upon, because they take away the eggs, and destroy the hopes of the laying season. The nests of these destructive birds are carefully noticed, and to destroy the voracious family at a blow, they seek to kill the mother while sitting. Among the parent birds, some are very suspicious, and desert their nests as soon as any one approaches them. To lull suspicion, a carefully-covered watch-house is made at the foot of the tree in which there is a nest, and a man conceals himself in it to

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await the return of the parent bird; but he waits in vain if she has ever before been shot at in the same manner. She knows that fire will issue from the cave into which she saw a man enter. While maternal love keeps her eye fixed upon her nest, fear prevents her return till night hides her from the sportsman's sight. To deceive this suspicious bird, the plan was hit upon of sending two men to the watch-house, one of whom passed on, while the other remained; but the crow counted, and kept her distance. The next day three went, and again she perceived that only two retired. In fine, it was found necessary to send five or six men to the watch-house to put her out in her calculation. The crow, thinking that this number of men had but passed by, lost no time in returning. This phenomenon, always repeated when the attempt is made, is to be recorded among the very commonest instances of the sagacity of animals.⁷ (Leroy 1870, 125–26)

This passage in the original French appears in volume eight [1765] of Diderot 1751–65, 797. The letter was republished in 1768 in a collection of letters, *Sur les Animaux*, with the designation "Letter VII."⁸ The same letter was published posthumously in Leroy 1802, with the passage appearing at 149–50.⁹

Leroy, the "spiritual founder of the comparative analysis of behavior" according to Philip Gray (1968, 379), influenced much of the development of comparative psychology in the nineteenth century. The 1870 English translation of his *Lettres* was well known to Lubbock and his *Nature* readers, for he does not cite which work of Leroy's he was quoting—as though it would have been obvious.¹⁰ Romanes and Darwin (1884, 146–47; 361) both refer to Leroy's book. Moses Marx (1898) wrote an entire dissertation on Leroy's work. And finally, C. Lloyd Morgan (1906, 252–53) describes at length Leroy's crow story.

If Leroy's description is the actual source of Rand's story, we may contrast the two versions in the following manner. Contrary to Rand's rendition, no "experiment" was performed by "hidden

observers" upon "a flock of crows" to "ascertain the extent of the ability of birds to deal with numbers." Instead, Leroy compiled anecdotal accounts among everyday people who had the common desire to eradicate their local egg-eating magpie population. In the transition from Leroy to Rand, it seems that the story was updated to reflect a more "disinterested," scientific age.

Acknowledgments

Thanks to Tom Porter for inspiring me—years ago—to try to find the origin of the crow "experiment." Thanks to William Loughner and W. R. C. Shedenhelm for help in researching this topic and to O. Bradley Bassler and Geneviève Esquivié-Smith for help in translation.

Notes

1. Campbell (1999, 112) notes that "Nathaniel Branden netted out to Rand what one of his psychology professors had said about Miller's work; the crow study was *presumably* one of the illustrations that the professor used" (emphasis mine). Branden tells me (in personal communication, 3 October and 4 October 1999), that he is fairly sure that he conveyed to Rand the crow study, but he cannot recall the identity of the psychology professor.

2. Furthermore, "[d]uring training and 'spontaneous' experiments . . . the observer and the bird were always separated by a partition so that the experimenter was never seen by it; while at work he was able to watch it through the viewfinder of a cine-camera fitted into the wall" (489).

3. It is at most only half true that Koehler found that crows could be trained to count to seven, as Tom Porter states in his recent work (1999, 242). Koehler (1956, 495) found that jackdaws could subitize up to six and ravens up to seven.

4. The quotation from Lubbock comes from Lubbock 1885, 45. He reused the quotation in his later Lubbock 1897, 281–82. Clawson (1994, 39) characterized Lubbock as "a nineteenth-century astronomer and mathematician." This is a mistake: Lubbock's *father*, also named Sir John (William) Lubbock, was the astronomer and mathematician. The later Lubbock—the author of the *Nature* article—was a banker, statesman, and naturalist. Cf. the entry under "Lubbock, Sir John" in Chernow and Vallasi 1993, 1624; and Grant Duff 1924, 1–2.

5. Conant's use of the crow story has been cited explicitly in Groza 1968, 4; Boyer 1968, 1; and Clawson 1994, 39. Uncited but unmistakable uses were made in Dantzig [1930] 1954, 3–5; and Smeltzer 1958, 3–4.

6. The biographical information comes from the introduction to Leroy 1802, v–xiv.

7. In the French, the "crows" are *pies*—magpies. A similar passage can be found in a contemporary work of Leroy's by Gueneau de Montbeillard:

Sportsman say, that if a Magpie sees a man enter a hut built at the foot of the tree on which it breeds, it will not go into its nest till it has perceived the man leave the hut; that if two enter, and only one comes out, it will not be deceived by the stratagem, but will stay till the second also comes out; that it will likewise distinguish three out of four, and even four out of five, beyond which it cannot discriminate. It would thence follow, that the Magpie has a distinct idea of the series of numbers, from one to five; and it must be confessed that the glance of a man's eye is not perhaps more accurate. (Buffon 1792, 3: 80)

As Elizabeth Anderson notes in Leroy 1994, 249 n. 10, this story may have been copied from Leroy. However, observe that the number of units that the magpies could discriminate is one greater in Buffon's account.

8. Cf. Leroy 1994, 139–40, for the same passage pertaining to the counting crows.

9. Cf. Marx 1898, 14–21 for an historical overview of the letters.

10. This is all the more striking since there was another Charles Le Roy (1726–1779), who was a fairly well-known physicist (Gough 1973, 255–56).

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