

Working Papers on The Nature of Evidence:
How Well Do 'Facts' Travel?
No. 23/08

**Escaping the Laboratory:
The Rodent Experiments
of John B. Calhoun
& Their Cultural Influence**

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January 2008



“The Nature of Evidence: How Well Do ‘Facts’ Travel?” is funded by The Leverhulme Trust and the ESRC at the Department of Economic History, London School of Economics.

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Escaping the Laboratory: The Rodent Experiments of John B. Calhoun & Their Cultural Influence

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Abstract

In John B. Calhoun's early crowding experiments, rats were supplied with everything they needed – except space. The result was a population boom, followed by such severe psychological disruption that the animals died off to extinction. The take-home message was that crowding resulted in pathological behaviour – in rats and by extension in humans. For those pessimistic about Earth's "carrying capacity," the macabre spectacle of this "behavioural sink" was a compelling symbol of the problems awaiting overpopulation. Calhoun's work enjoyed considerable popular success. But cultural influence can run both ways. In this paper, we look at how the cultural impact of Calhoun's experiments resulted in a simplified, popular version of his work coming to overshadow the more nuanced and positive message he wanted to spread, and how his professional reputation was affected by this popular "success."

Introduction

In 1947, John B. Calhoun's neighbour agreed to let him build a rat enclosure on disused woodland behind his house in Towson, Maryland. Calhoun would later reflect that his neighbour probably expected a few hutches, perhaps a small run. What Calhoun built was quarter acre pen, what he called a "rat city," and which he seeded with five pregnant females. Calhoun calculated that the habitat was sufficient to accommodate as many as 5000 rats. Instead, the population levelled off at 150, and throughout the two years Calhoun kept watch, never exceeded 200. That the predicated maximum was never reached ought to come as no surprise: 5000 rats would be tight indeed. A quarter acre is little over 1000 square meters, meaning each rat would have to itself an area of only about 2000 square centimetres, roughly the size of an

individual laboratory cage. Be that as it may, a population of only 150 seemed surprisingly low. What had happened?

Employed in the Laboratory of Psychology of the National Institute of Mental Health from 1954, Calhoun repeated the experiment in specially constructed “rodent universes” – room-sized pens which could be viewed from the attic above via windows cut through the ceiling. Using a variety of strains of rats and mice, he once more provided his populations with food, bedding, and shelter. With no predators and with exposure to disease kept at a minimum, Calhoun described his experimental universes as “rat utopia,” “mouse paradise.” With all their visible needs met, the animals bred rapidly. The only restriction Calhoun imposed on his population was of space – and as the population grew, this became increasingly problematic. As the pens heaved with animals, one of his assistants described rodent “utopia” as having become “hell” (Marsden 1972).

Dominant males became aggressive, some moving in groups, attacking females and the young. Mating behaviors were disrupted. Some became exclusively homosexual. Others became pansexual and hypersexual, attempting to mount any rat they encountered. Mothers neglected their infants, first failing to construct proper nests, and then carelessly abandoning and even attacking their pups. In certain sections of the pens, infant mortality rose as high as 96%, the dead cannibalized by adults. Subordinate animals withdrew psychologically, surviving in a physical sense but at an immense psychological cost. They were the majority in the late phases of growth, existing as a vacant, huddled mass in the centre of the pens. Unable to breed, the population plummeted and did not recover. The crowded rodents had lost the ability to co-exist harmoniously, even after the population numbers once again fell to low levels. At a certain density, they had ceased to act like rats and mice, and the change was permanent.

Calhoun published the results of his early experiments with the rats at NIMH in a 1962 edition of *Scientific American*. That paper, "Population Density and Social Pathology," went on to be cited upwards of 150 times a year.¹ It has since been included as one of "Forty Studies that Changed Psychology," joining papers by such figures as Freud, Pavlov, Milgram, Rorschach, Skinner, and Watson (Hock 2004). Like Pavlov's dogs or Skinner's pigeons, Calhoun's rats came to assume a near-iconic status as emblematic animals, exemplary of the ways in which behavioral experimentation at once marks and violates the human-animal distinction. The macabre spectacle of crowded psychopathological rats and the available comparisons with *human* life in the densely-packed inner cities ensured the experiments were quickly adopted as "scientific evidence" of social decay. Referenced far outside of the fields of ecology and mental health, Calhoun's rats have – or certainly had – come to seem part of the common cultural stock, shorthand for the problems of urban crowding just as Pavlov's dogs were for respondent conditioning. Along with their public popularity, the experiments played a critical role in the development of disciplines and research fields, so much so that sociologist and human ecologist Amos Hawley (1972) would remark that the extent of their influence was itself a "curious phenomenon."

¹ Calhoun reflects on this in: Calhoun, J. B. C. 1979. "Employee's contribution to the Performance Assessment of his Scientific Service. [Draft.]" 4 December. John B. Calhoun Papers, National Library of Medicine (NLM), Bethesda, MD. n.p.

