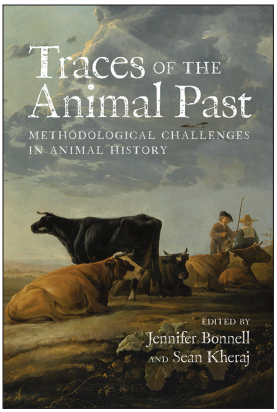
UNIVERSITY OF CALGARY
Press



TRACES OF THE ANIMAL PAST: METHODOLOGICAL CHALLENGES IN ANIMAL HISTORY

Edited by Jennifer Bonnell and Sean Kheraj

ISBN 978-1-77385-385-7

THIS BOOK IS AN OPEN ACCESS E-BOOK. It is an electronic version of a book that can be purchased in physical form through any bookseller or on-line retailer, or from our distributors. Please support this open access publication by requesting that your university purchase a print copy of this book, or by purchasing a copy yourself. If you have any questions, please contact us at ucpress@ucalgary.ca

Cover Art: The artwork on the cover of this book is not open access and falls under traditional copyright provisions; it cannot be reproduced in any way without written permission of the artists and their agents. The cover can be displayed as a complete cover image for the purposes of publicizing this work, but the artwork cannot be extracted from the context of the cover of this specific work without breaching the artist's copyright.

UNIVERSITY OF CALGARY
Press
press.ucalgary.ca

Acknowledgement: *We acknowledge the wording around open access used by Australian publisher,* **re.press**, *and thank them for giving us permission to adapt their wording to our policy* http://www.re-press.org

8

Guinea Pig Agnotology[1]

Joanna Dean

> Into your veins we inject all the ills and poisons of our higher civilization: anthrax, and diphtheria, cancer, smallpox and tuberculosis, leprosy, meningitis, pneumonia, typhus and typhoid, and all the infections of the eye and ear, of nose and throat, of bone and muscle and cartilage and nerve and gland, which humanity has accumulated in its march upward. All these bitter questions we put to you with the hypodermic needle and the scalpel and you react positively or you react negatively, but always to the full measure of your ability, and most often at the cost of your life. . . .
>
> Yes, you do your best, silent brother.
>
> Simon Strunk, *Professor Latimer's Progress* (1918)[2]

In the laboratory, animals are made invisible: their invisibility continues in the archives and extends into the stories told. As the authors of the *Oxford Handbook on the History of Medicine* observe, "In no body of scholarship is it more obvious, puzzling and true to say that 'animals disappear.'"[3] Even the guinea pig, the animal whose name has come to stand for the hapless victims of experimental medicine, has largely disappeared from the records. This chapter explores how this happened. It draws upon

agnotology, a concept developed by historians Robert N. Proctor and Londa Schiebinger, who argue that "a great deal of attention has been given to epistemology (the study of how we know) when 'how or why we don't know' is often just as important, usually far more scandalous, and remarkably undertheorized."[4] The chapter will track the disappearance of the guinea pig in the records of the Connaught Laboratories in Toronto and consider the cognitive dissonance created by the gulf between the guinea pig's role as a laboratory animal and its role as a much-loved pet. I will suggest that in the early twentieth century an emerging antivivisection movement shaped actions within and without the laboratory and altered the nature of the records kept and stories told. Even today, in order to access the archives of the Connaught Laboratories on the sprawling modern Sanofi Pasteur Canada campus, the researcher must be accompanied by the archivist, approved by staff, and, like all visitors to the facility, must pass through a security gate, overseen by security personnel. Animal research is ongoing at the laboratory and so security is tight.

The story of the University of Toronto's Connaught Laboratories begins in 1913, when John G. Fitzgerald constructed a stable in his obliging assistant's yard on Barton Avenue in downtown Toronto. In 1917, the laboratories moved to their current location north of the city where an elegant stucco stable was built. The original Barton Avenue stable was relocated to the site in 1935 and restored as a museum in 2004.[5] It now stands incongruously on the Sanofi Pasteur campus, where it serves as a material reminder of the laboratory's humble origins, memorialized as "The Miracle Factory that began in a Stable."[6]

The Barton Avenue stable housed two species: horses and guinea pigs.[7] Horses were the living factories from whose blood antitoxins were extracted. Guinea pigs were the living meters. The little animals were injected with a fatal dose of diphtheria or tetanus toxin and then given varying amounts of horse serum to counter the toxin. Their fate calibrated the serum's potency. Horses became the heroes of laboratory medicine, trotted out time and again as the photogenic saviours of countless small children.[8] They continue to be memorialized in the stable museum, in online exhibits and in Connaught publications (Figure 8.1). The guinea pigs, by contrast, were and are invisible. Their unpleasant fate could not be glossed over as any kind of heroic service to mankind, and they rarely

Fig. 8.1 The horses used for the production of antitoxin were celebrated as equine heroes. This lantern slide is one of a series produced by Connaught Laboratories to make the public comfortable with the new biomedical products. Source: Lantern Slide Ags020, Sanofi Pasteur Canada (Connaught Campus) Archives, Toronto.

figure in laboratory publicity. There is no reference to their existence in the stable museum. They appear only occasionally in the archives.

Guinea pigs (*Cavia porcellus*) are native to the Andes, where they have served as an important source of protein since at least 2,500 BCE and possibly as early as 5,000 BCE (which makes their relationship with humans as long standing as that of their stable mates on Barton Avenue).[9] They were imported to Europe in the sixteenth century, where they became pets, first among the aristocracy, then more widely.[10] By the nineteenth century, they were so familiar in Britain that their round little bodies were used to describe the morphology of such North American species as the beaver, the woodchuck, and the chipmunk.[11] In Canada, a guinea pig was used

to illustrate the letter G in the *Canada Spelling Primer* (1850), evidence of both the exoticism of the little animal and its growing familiarity.[12]

Guinea pigs were, and are, docile and endearing pocket pets.[13] They do not carry associations with filth or disease, like mice and rats. They communicate with each other, and their handlers, with whistles (if excited), purring (when petted), squealing, rumbling and chirping. A series of letters in the children's section of the Toronto newspaper *The Globe* and the *Ottawa Journal* attest to their charm, especially it seems for little boys.[14] Roland Ellard of Pickanock, Quebec, wrote in 1898 that he had forty guinea pigs: "they will stand on their hind legs and 'squeak, squeak' when they hear my footsteps near their door. After I talk to them and pet them, they lie down quite contented, but I must let them know first that I have noticed them and must pet each one."[15] Thirteen-year-old Evelyn Wade of Renfrew, Ontario, described his guinea pigs as "very stupid" animals prone to fighting: "They have teeth about three quarters of an inch long," he observed, "Sometimes if you take one up when it is angry, it will bite you, and it hurts, because the teeth are so sharp."[16] It is only at the end of his letter that young Wade remembers that he hopes to win a prize, and notes that guinea pigs are nice pets for children because they are fun to play with and do not carry disease like cats and dogs.

The children's letters stand in odd contrast to contemporaneous articles describing the use of guinea pigs as test subjects. On the pages of the newspapers, guinea pigs are inoculated, time and again, with noxious substances to test their toxicity. Their use as test subjects was such common knowledge that guinea pig trials featured in a long running series of advertisements for a dandruff treatment. As a 1907 ad boasted in large font, "The Guinea Pig Proved It."[17] This curious pairing of the pet and the laboratory test subject is repeated in a photograph taken in the 1920s of a young boy playing with the Connaught guinea pigs (Figure 8.2).

Guinea pigs were known for their innocence. As early as 1811, a natural history text noted: "These animals are, of all others, the most helpless and inoffensive."[18] This innocence could at times be understood as a kind of purity: when a distraught child asks whether animals go to heaven in the evangelical classic *The Gates Ajar* (1869), she chooses the guinea pig as her most compelling example: "O mamma mamma, Don't little CLEAN *–white – guinea-pigs* have souls?"[19] Her mother allows that the gates of

Fig 8.2 Boy playing with guinea pigs at the Connaught Laboratories Farm, ca. 1920s. Source: Photograph Acc1741, Sanofi Pasteur Canada (Connaught Campus) Archives, Toronto.

heaven might open for the guinea pig. But such sweet innocence could also be cast as stupidity: Wade described his pets as "very stupid." The author of *Three Hundred Things a Bright Boy Might Do* (1910) noted: "Some who ought to know better have said that cavies are very dull, stupid little animals."[20] Like young Wade, he was quick to make a disclaimer, noting "I entirely disagree with this." In 1915, a breeder described the guinea pig as a "singularly inoffensive and defenceless creature," noting that they lack "that intelligence which usually characterises domestic pets."[21] There seems to have been a wide consensus that the guinea pig was a much loved and responsive little pet but that it had none of the answering intelligence of a dog.

At the end of the nineteenth century, a guinea pig fancy developed. Hobbyists bred what they called cavies in a wide range of exotic colours, coat patterns, and coat types. In 1888, a correspondent in Canada's *Pigeons and Pets* described the cavies at Britain's Crystal Palace Show and urged Canadians to pursue the hobby: "They should be worth taking up, as they are very little trouble, and present many opportunities for scientific breeding." Poultry and farm exhibitions began to include entries for different kinds of cavies: Peruvians (with long silky hair), Abyssinians (with rosettes), and English short hairs. In 1892, the publisher of *Pigeons and*

Pets, H. B. Donovan, imported three Peruvians, three Abyssinians, and eight English short-hair cavies from England. By 1892, he was advertising offspring "bred direct from my English stock" for three to five dollars a pair in his *Canadian Poultry Review*. Guinea pigs reproduce quickly, and two years later Donovan was offering free stock in a subscription drive: an Abyssinian he claimed was worth three dollars and a smooth coated guinea pig worth two dollars.

It was likely a breeder like Donovan who supplied Fitzgerald with the Connaught's first colony of guinea pigs. Fitzgerald had famously purchased his first five horses from the "glue factory" (presumably the slaughter house) for three dollars apiece, and it is likely he was equally parsimonious in acquiring his guinea pigs. Certainly, the animals described in the 1913–15 Connaught laboratory books were a motley lot: #76 was black and white and tan on neck; #77 was black and white and tan on the rump; #78 was simply brown; and #87 was white and tan with a brown spot on the head. None are described as having long hair, or rosettes, though #104 is described as "curly, brown and white."

Fitzgerald's methods were modelled upon those used at the laboratories he had visited: the Pasteur Laboratories in France, the Lister Institute in London, and public health laboratories in New York City. By 1914, enormous numbers of small animals were used in the routine testing and calibration of biomedical products. Most laboratories bought their guinea pigs from small scale breeders, and over time "cavy ranching" became a lucrative industry.[22] Prices increased during the First World War in the face of a "guinea pig famine," reaching two dollars in Canada.[23] The American author of *Cavy Culture: A Book of Practical Instructions on the Raising and Marketing of Guinea Pigs* (1920) observed optimistically that a three-month-old pig could be raised to market for ten to fifteen cents, and a breeding female could produce twelve to fifteen young a year. A colony of five to six females could be lucrative: "Thus at a very conservative estimate one may reasonably expect about one hundred offsprings [*sic*] at the end of the first year, which should be worth from $75.00 to $125.00 according to their size."[24] In 1924, in "Making More Money. . . . With Guinea Pigs," the *Windsor Star* quoted a Boston-area breeder: "In spite of the fact that the guinea pigs increase with great rapidity, says the owner of the 'cavy ranch,' the supply always falls short of the demand and

it is because of this that the raising of the pets is lucrative, as well as a most interesting business." He claimed they could be sold at "excellent prices" to "laboratories, hospitals, and experimental stations."[25] At Toronto's 1925 Royal Winter Fair, testimonials from laboratories in Ontario and Alberta were on display. An article in *The Globe*, titled "The Humble Guinea Pig," noted that the Toronto General Hospital alone used thousands of guinea pigs in a year; a "lady exhibitor" was quoted as saying: "The guinea pig is absolutely indispensable."

Prices, however, had declined by 1925 to one dollar for a large animal, and sixty-five cents for the smaller ones.[26] After the Second World War, small holders were squeezed out of the market as more centralized breeding facilities were developed, in Britain taking what Robert G. W. Kirk has described as a socialist form with the Laboratory Animals Bureau, and in the United States, a more privatized form with such facilities as the Wistar Institute.[27] A series of booklets from the US Department of Agriculture chart the shifting market: the author of the 1949 brochure was cautious about the potential for sales. By 1962, they made the following recommendation: "*Do not expect to make large profits immediately by raising laboratory animals*"[28] (italics in original).

Scientists at the Connaught Laboratories chose to breed much of their own stock, following the practice of elite British laboratories. It was not easy. They experimented with housing and diet until an outbreak of streptococcal infection wiped out the original colony, which was replaced by 125 white pedigreed guinea pigs purchased from the Lister Institute in London in 1930 (Figure 8.3). Even these struggled. A report in the archives provides a rare glimpse of the difficulties faced by the laboratory (and, of course, the guinea pigs): the laboratory attributed the deaths of the first generation of Lister animals to the rigours of travel, and the deaths of the Connaught-born animals to premature breeding. (This is not entirely surprising. The animals were bred early: of the 93 of 205 pregnant females that died, 39 of them were bred before they were 60 days old, and another 31 before they were 30 days old.[29]) The diet may also have been deficient, as the Connaught Laboratories experimented with various formulations of prepared food. A 1947 article on the care and feeding of guinea pigs observed that "the aim of evolving a dry pelleted stable diet completely adequate for guinea-pigs has not yet been realized," and

Fig 8.3 Connaught guinea pig colony, August 1929. The laboratory struggled to maintain the colony, and the following year these animals were replaced by white pedigreed guinea pigs from the Lister Institute. Source: Photograph Acc0048, Sanofi Pasteur Canada (Connaught Campus) Archives, Toronto.

noted that a pelleted diet must be supplemented with "fresh greenstuff, dried cabbage or ascorbic acid."[30] The Connaught report makes no reference to supplements. British scientists were disparaging of the breeders who supplied guinea pigs to laboratories, describing them as "largely undereducated, working-class, 'every-day sorts'" who "cannot spell their name in block letters."[31] But books by breeders emphasized the need for greens; even the boys writing to *The Globe* described the need for a variety of vegetables.[32] Eventually, mice came to be preferred to guinea pigs at Connaught Laboratories. A 1969 article on the animal colonies in their internal publication, *The Contax*, attributed the shrinking size of the guinea pig colony to difficulties breeding: guinea pigs are much more difficult to breed than mice. Females cannot be mated until they are fourteen weeks old, the gestation period is sixty-three days, and, on average, only three young are produced per litter. The production life of a female guinea pig is 16–18 months."[33] Also, as Karen Rader has noted, mice carried little of the affective value of such pets as dogs, and, we might argue, guinea pigs.[34]

Even when they were breeding and using thousands of the little animals, the guinea pigs were largely invisible in the public relations campaigns of the Connaught Laboratories. Their absence is most apparent in comparison to the extraordinary visibility of the horse. The archives are replete with heroic horses: the researcher is introduced to Crestfallen, the

diphtheria horse; Brick Top, the tetanus horse; and Molly, the meningitis horse. Collages include photographs of horses running free through bucolic fields. The newspaper article that introduced the laboratory to Toronto in 1916 set the tone: the laboratory supplied carefully posed photographs of calm horses being bled and offered reassurances about the horses' well-being: "Now most people think that the bleeding causes the horse to suffer. As a matter of fact, the horse hardly seems to notice it but stands quietly and patiently while the blood is being taken." The reference to the guinea pigs contains no such reassurance: "These guinea pigs are used to standardise the doses of anti-toxin. A little guinea pig is given a fatal dose, say one unit of diphtheria toxin, then the anti-toxin is injected. In this way it is found how much anti-toxin is needed to neutralize the diphtheria toxin, so that it can be reckoned how much anti-toxin should be injected into a patient suffering from diphtheria to counteract the disease." There are no photographs, no textual description of the guinea pigs, and no discussion of the degree of suffering.

Although the horses are initially identified by name in Fitzgerald's lab books (Crestfallen, for example, appears repeatedly as a donor of serum), the individual guinea pigs remain anonymous. As Figure 8.3 shows, the guinea pigs are identified by appearance and number in the lab books before they either succumb to diphtheria or are "discarded." The first guinea pig, for example, was white, weighed 252 grams, and lived less than forty-eight hours after being injected subcutaneously with 0.1 cc of prepared serum in 0.9 cc NaCl (salt solution) on 27 October 1913. The second, a white and black guinea pig weighing 275 grams, was injected on October 31 and succumbed two days later. Their deaths were marked with a cross. These first two were assigned numbers after the fact, and all subsequent guinea pigs are in neat sequential order: #3, a fawn weighing 280 grams, died at three days; #4, another white and black fawn was discarded; and #5 is missing. On November 7, a second toxin was tested on #6, black with fawn at 315 grams, who died after 3–4 days. On November 17, a third toxin was tested on #7, white at 280 grams, and #8, black with a brown collar at 250 grams, both of whom were "alive and well" on December 8, and both discarded. As time went on, Fitzgerald noted the weights on survival before discarding them.[35]

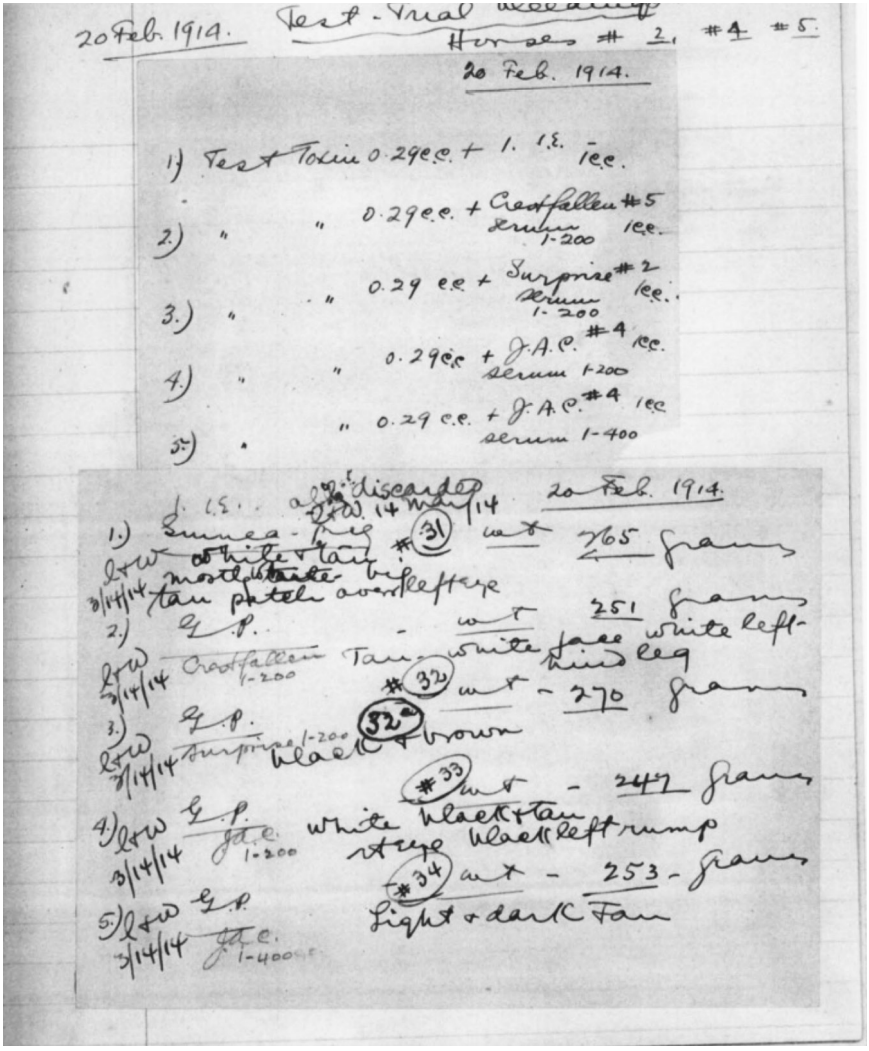
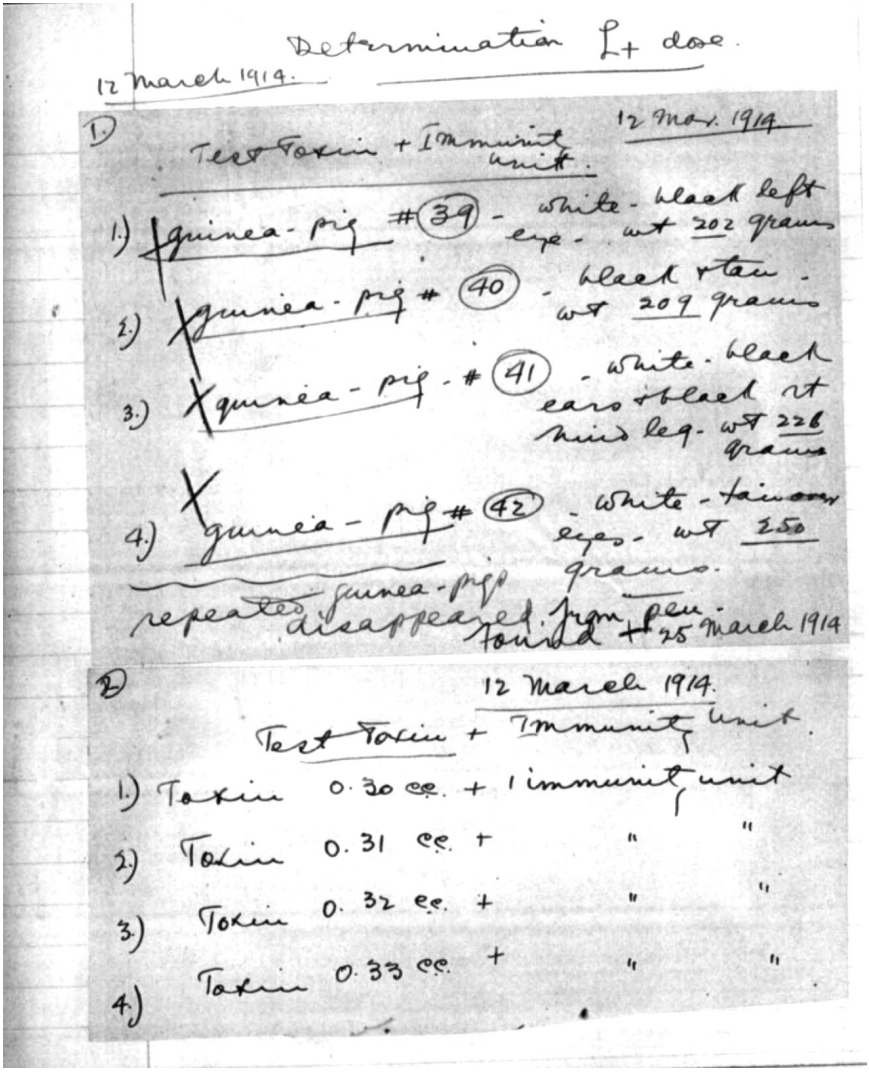


Fig. 8.4a and 8.4b In James G. Fitzgerald's laboratory book (4a) horses are identified by name as well as number, and guinea pigs by weight and coat colour. Numbers appear to have been inserted later. On the other page (4b) the escape of the guinea pigs is noted. Source: James G. Fitzgerald, "Record of Diphtheria Toxins. 1913–1914–1915," Department of Hygiene, University of Toronto. Sanofi Pasteur Canada (Connaught Campus) Archives, Toronto.



Determination L+ dose.

12 March 1914.

1)

Test Toxin + Immunity Unit. 12 Mar. 1914

1.) ~~Guinea-pig~~ #39 - White - black left eye - wt 202 grams

2.) ~~Guinea-pig~~ # 40 - black + tan - wt 209 grams

3.) ~~Guinea-pig~~ - # 41 - White - black ears + black rt hind leg - wt 226 grams

4.) ~~Guinea-pig~~ # 42 - White - tan eyes - wt 250 grams.

repeated ~~Guinea-pig~~ disappeared from pen found + 25 March 1914

2)

12 March 1914.

~~Test Toxin~~ + Immunity Unit.

1.) Toxin 0.30 cc. + 1 immunity unit

2.) Toxin 0.31 cc. + " "

3.) Toxin 0.32 cc. + " "

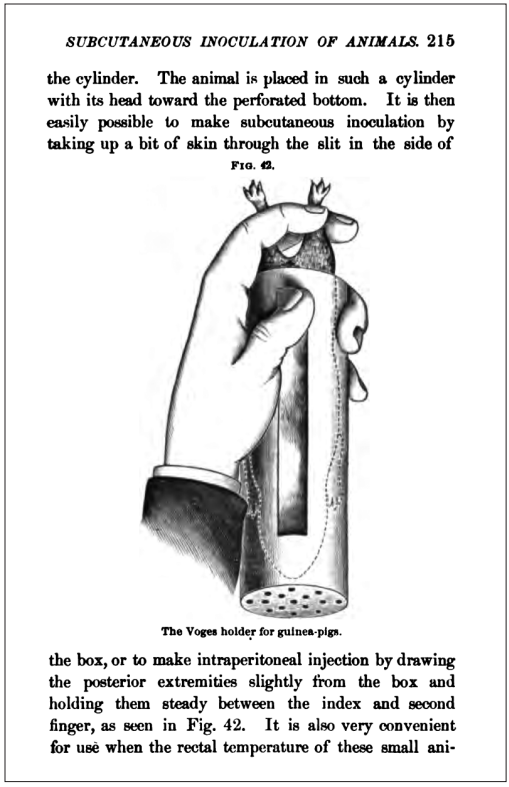
4.) Toxin 0.33 cc. + " "

The "discarding" of tested animals was a precaution: the author of *Cavy Culture* noted that "used" guinea pigs—those that had been used for testing antitoxins—were sometimes resold by "small and unreliable institutions."[36] Such animals dangerously altered results if they were used a second time. The Connaught Laboratories did not record their methods of disposal, but *Cavy Culture* noted that "used guinea pigs" were suffocated in large gas machines.

The descriptions in the Connaught laboratory books are just adequate to distinguish one guinea pig from his or her companions. Most descriptions are simple: #45 was simply black; #47 was dark brown; #46 was white with a "tan left ear, tan left hind leg, and on back"; and #48 was an elaborate patchwork ("black, white and tan, black left eye, tan right, black saddle, brown right hind leg"). In these early years, their weights varied between 240 to 280 grams with occasional outliers at 215 grams (#28), 300 grams (#30), and even 370 grams for an unidentified specimen on 25 September 1914. These were young guinea pigs; the standard size of an adult guinea pig in 1947 was 800–900 grams.

There is little evidence of agency on the part of the animals. On 12 March 1914, four guinea pigs (#39, #40, #41, and #42) disappeared from their pen. They were found dead on March 25. Multi-coloured guinea pig #48 may have squirmed: Fitzgerald noted (using an awkward third person construction that may reflect some embarrassment at his clumsiness) that, "in injecting some of the mixture escaped." Toxin was a deadly poison, for human scientists as well as laboratory subjects, so slips were dangerous. Devices like the Voges holder (Figure 8.5) were often used to restrain the animals. As their use became routine, the guinea pigs disappear completely from the second laboratory book. On December 15 [1914?], a note directs readers: "for potency and sterility tests see files." The files have not been archived, and even this note disappears on subsequent pages. Over time, guinea pigs were made increasingly invisible until they disappeared entirely from internal laboratory reports, of no more note than the other tools of laboratory medicine.

Was their invisibility simply due to the routine nature of the guinea pig's role in the antitoxin laboratory? Or could it be related to rising antivivisection sentiments? Antivivisection movements were vocal by this time in the United States and Britain, and although there was as yet no



SUBCUTANEOUS INOCULATION OF ANIMALS. 215

the cylinder. The animal is placed in such a cylinder with its head toward the perforated bottom. It is then easily possible to make subcutaneous inoculation by taking up a bit of skin through the slit in the side of

FIG. 42.

The Voges holder for guinea-pigs.

the box, or to make intraperitoneal injection by drawing the posterior extremities slightly from the box and holding them steady between the index and second finger, as seen in Fig. 42. It is also very convenient for use when the rectal temperature of these small ani-

Fig. 8.5 The Voges holder made guinea pig handling more efficient. Source: A. C. Abbott, M.D., *The Principles of Bacteriology: A Practical Matter for Students and Physicians* 8th ed. (1909). Accessible via Internet Archive: https://archive.org/.

organized movement in this country, well-read Canadians were aware of the issue. Darcy Ingram has argued that the more radical wings of animal advocacy were deliberately suppressed in Victorian Canada, and, as I have argued elsewhere, Canadian apprehensions about the growing power of laboratory medicine appear to have been channelled through the antivaccination movement in the first two decades of the twentieth century. Public relations of another Toronto laboratory suggest that scientists were feeling defensive in 1912. A newspaper story, titled "Toronto's New Laboratory is Best on the Continent," featured a photograph of a bank of guinea pig cages, but the animals are out of sight and the visual emphasis is on the modern technology of metal cages, with glass above and plumbing below. The text reassured readers that the guinea pigs were not kept for vivisection. The distinction drawn is revealing: "They are not kept for purposes

of vivisection, but as a medium to receive inoculations of certain germs when human life is at stake." Guinea pigs were simply a "medium." They were diagnostic tools whose aliveness was irrelevant, and whose deaths did not fit the narrow definition of vivisection.[37]

In 1921, the Canadian Anti-Vivisection Society took form in Toronto, and similar groups subsequently appeared in other major centres, such as Montreal, Ottawa, Calgary, and Victoria.[38] The membership of Canadian groups, like those in Britain and the United States, was largely made up of women. They were linked to the suffrage movement. Flora Macdonald Denison, a theosophist and suffrage writer, had been influential in the formation of the Toronto group. Her sister, Agnes Stanley, and her son, Denison, were among the forty members at the first 1921 meeting, where Stanley, who took on a leading role, noted that she took up the work on her sister's account.[39] Toronto's medical officer of health Dr. Hastings had already dismissed the concerns of antivivisectors on gendered grounds in 1918, saying that "only a small proportion of the population—the feather brain portion—will object to the experimental inoculation of animals." (One letter writer took issue and responded, "As one of the 'feather brained.'"[40]) In 1922, facing an organized antivivisection society, Hastings was blunt. He is quoted as saying (in a newspaper article positioned directly below an item about an antivivisectionist speaker from Britain and probably solicited for the purpose), "the foes of vivisection put themselves in the strange position of preferring the lives of guinea pigs and rabbits to those of human beings. 'They put pigs before babies,' says the Medical Officer of Health."[41] The direct linkage of guinea pig suffering to the protection of infants was a line of argument well honed by defenders of laboratory medicine.[42]

A second line of argument was that the guinea pigs did not suffer. Representatives of the Montreal General Hospital had made this distinction in 1895: when the president remarked on whether vivisection was practiced, the secretary said that "no pain was inflicted upon the animals; they were simply pricked with a hypodermic needle. There was no cutting at all. The guinea pigs were only poked with a needle."[43] (This emphasis on "cutting" is preserved in the definition of vivisection in the *Oxford English Dictionary*: "The action of cutting or dissecting some part of a living organism; *spec.* the action or practice of performing dissection, or other

painful experiment, upon living animals as a method of physiological or pathological study.") In 1923, a Montreal serologist, Dr. F. A. Bert, gave a talk on serums in which he described the benefits of diphtheria antitoxins, and reassured his listeners that the horses are better treated in the lab than on farms. Without going into detail, he also reassured his listeners that no maltreatment of guinea pigs is tolerated and "ether is administered to avoid suffering."[44]

A very different line of argument emerged four years later in the melodramatic *Microbe Hunters* (1926) by American microbiologist Paul de Kruif. The book is credited with inspiring a generation of microbiologists. Chapter Three, "Massacre the Guinea Pigs," briefly deploys the first argument about the protection of infants, but dwells on the horrors of early work on antitoxins: "It was to save babies that Roux and Behring launched into the most relentless massacre of guinea pigs that the scientific world had heard of."[45] De Kruif describes in excruciating detail the "vast butcheries of guinea pigs and rabbits," explaining how the scientist Emile Roux "became a murderer in his heart" as he looked for "ruffled hair, the dragging hind legs, the cold shivering bodies" of his victims and watched the toxin "do dreadful things to his animals" in the "vast slaughterhouse of dead and dying guinea pigs his laboratory was." "The guinea pigs which survived probably wished they were dead, for, while the trichloride was curing them it was burning nasty holes in their hides too—they squeaked pitifully when they bumped these gaping sores. It was an appalling business." The pain is dwelt upon, almost pornographically, and it is described as a necessary prelude to the cure: "those maimings and holocausts and mistakes, always the necessary prelude to his triumphs." This chapter, which was reprinted in newspapers, represents an interesting shift: the pain inflicted by the scientist is glorified as a burden he (and it was almost always he) must carry in order to develop a cure.

It was not an easy burden to carry. John G. Fitzgerald, the brilliant scientist behind the Connaught Laboratories, suffered a mental breakdown at the age of fifty-six in 1938 and died by suicide in 1940. We will never know the cause of his distress. Could the "maimings and holocausts and mistakes" inherent in this form of work have exacted a toll on the researcher in the form of a post-traumatic stress disorder? In a series of letters written from a sanatorium in 1939, Fitzgerald repeatedly referred to having

committed "the unpardonable sin," for which, "the penalty is death."[46] The idea that cruelty to animals is an unpardonable sin is common in antivisection literature.[47] James Fitzgerald explored his grandfather's difficulties in a melodramatic book about the family history of mental illness; he attributed John G. Fitzgerald's distress to overwork, and although he describes the deaths of thousands of guinea pigs, their squirming during treatment, and the necessity for cruelty in laboratory science, he does not consider the emotional toll of his grandfather's work with laboratory animals.[48] Is the failure to consider this possibility a further expression of agnotology? Robert G. W. Kirk argues that scientists, and their historians, have shied away from considering the emotional impact of the lived experience of working with and caring for experimental animals: "Where emotion appears in existing historiography on animal research it tends to be framed in such a way as to conform closely to the sciences' own terms; emotions are problematic and they are recognised only insofar as they have to be controlled and removed from the experimental encounter."[49]

The docile guinea pig was peculiarly vulnerable to the hardening of the heart. The contrast with the dog is revealing. In 1923, the Connaught media campaign slipped badly in what was their greatest success, the discovery of insulin. Connaught scientist Frederick Banting was impolitic enough to describe his work in detail in the *Toronto Daily Star*. On reading his account, Agnes Stanley (founding member of the Canadian Anti-Vivisection Society in Toronto, as noted above) wrote a sarcastic letter commending Banting for his honesty: "Even Dr. Banting, in a very touching report of his Detroit speech, told of his distress at the suffering of the little dog who had assisted him so valiantly in his experiments. Dr. Banting seems to have no illusions concerning the cruelty of his experiments."[50] The difficulty was compounded by Banting's candour about the source of his dogs. As the reporter put it, the scientist resorted to "slinking in the midnight shadows on the trail of homeless canines."[51] Pet owners in Toronto were understandably alarmed, and the new Anti-Vivisection Society claimed to have collected 8,000 signatures asking the provincial government to ban the use of dogs in vivisection.[52] The British *Abolitionist*, drawing on information provided by the Ottawa Anti-Vivisection Society, published an article titled "Dr. Banting as a Dog Stealer," with a cartoon of Banting in a white lab coat, knife in hand, threatening to cut the pancreas

from a sweet puppy dangling from his other hand.[53] (The laboratories, for their part, re-invented Banting's dogs as a heroes on par with diphtheria horses: as Matthew Klingle has shown, "Marjorie" is now a poster child for insulin.[54])

Lessons were learned from Banting's mistake. Over time, as Susan Lederer has shown, the individual sensing animal was excised from medical journals and descriptions of experiments were edited to reduce their emotional impact. Significantly, these efforts focused on the dog: researchers were advised to refer to the "animal," rather than the "dog." The efforts to minimize the number of dogs in reports of medical experiments did not extend to guinea pigs, rats, and mice. These small animals were of less concern.[55] When he reflected on the uproar about his research a number of years later, Banting made the same distinction. He explained that the guinea pigs' physiology did not lend itself to experimentation on insulin. The implication was that he would have preferred to use the guinea pig, because, unlike the dog, the guinea pig was an expendable species. Antivivisection groups continued to emphasize the mistreatment of dogs, and largely overlooked the routine use of enormous numbers of guinea pigs in laboratories in diagnostic work and biomedical products.[56] The horse and the dog occupy a special place in human sympathies; science is showing that these two species are remarkably attuned to humans. Thousands of years of partnership have made them expert at reading and responding to human emotions; conversely, we are attuned to theirs. The little guinea pig does not participate in such a privileged relationship.

What conclusions can be drawn from the disappearing guinea pig? The first is that we need to be attentive to absences, especially in the archives, and ask what lies behind them. As Proctor and Schiebinger have pointed out, agnotology is rarely accidental. The simplest explanation for the absence of the guinea pig is that it was part of an orchestrated public relations strategy: horses were elevated as heroes, and guinea pigs, whose pain could not be explained away, disappeared. Medical historians have had little interest in digging further, as the story of the guinea pig only undermined the narrative of medical progress. But the absence exists prior to medical history and prior to public relations; it begins in the lab reports, which suggests that the full explanation lies within the scientist's mindset: a kind of cognitive dance by which the pain of the animal other could be

hidden even from the self. What is most intriguing about the absence of the actual guinea pigs is the way in which this absence is paralleled by the remarkable presence of the metaphorical guinea pig. Invisibility is cloaked by visibility. The guinea pig has come to be the animal most identified with experimental medicine. Even today, when the guinea pig itself has been largely replaced by other species in the laboratory, we still use the term "guinea pig" as shorthand for our own sense of vulnerability before the forces of medicine and science. The power of the metaphorical guinea pig hides the absence of the material and historical one.

NOTES

1 I would like to thank the organizers of the "Traces of the Animal Past" conference for asking me to develop my original blog on the guinea pig, "Guinea Pig Mea Culpa," and the other participants for their comments. I would also like to thank Christopher Rutty, archivist at the Connaught Campus, Sanofi Pasteur Canada, Toronto, for his assistance. All errors are my own. Joanna Dean, "Guinea Pig Mea Culpa," February 24, 2017, available at http://activehistory.ca/2017/03/guinea-pig-mea-culpa/.

2 Simon Strunsky, *Professor Latimer's Progress; A Novel of Contemporaneous Adventure* (New York: H. Holt, 1918; Toronto: McClelland, Goodchild and Stewart, 1918), 39. A professor launches into this soliloquy after releasing a guinea pig caught on a fence.

3 Robert G. W. Kirk and Michael Worboys, *The Oxford Handbook on the History of Medicine* (Oxford: Oxford University Press, 2011), 561. I owe this reference to Abigail Woods et al.'s excellent *Animals and the Shaping of Modern Medicine. One Health and its Histories* (London: Palgrave Macmillan, 2018). See also Jed Mayer, "The Expression of the Emotions in Man and Laboratory Animals," *Victorian Studies* 50, no. 3 (2008): 399–417; and Paul White "The Experimental Animal in Victorian Britain," in *Thinking with Animals: New Perspectives on Anthropomorphism,* ed. Lorraine Daston and Gregg Mitman (Columbia University Press, 2005). Mayer argues that cross-species sympathy ultimately banished the experimental animal from the public gaze, as scenes from the laboratory were considered too disturbing for readerly sensitivity.

4 Robert N. Proctor and Londa Schiebinger, eds., *Agnotology: The Making and Unmaking of Ignorance* (Stanford, CA: Stanford University Press, 2008), unpaginated preface.

5 For these dates and photographs of the museum, see Christopher J. Rutty, "From Insulin to Heparin: Innovation at Connaught Labs During the 1930s," at *Connaught Fund*, accessed September 30, 2019, http://connaught.research.utoronto.ca/history/article5/. For an account of the heritage restoration, see "Barton Avenue Stables," *Stevens Burgess Architects*, accessed September 9, 2019, http://www.sba.on.ca/projects/barton-avenue-stables.

6 June Callwood, "The Miracle Factory that began in a Stable," *Macleans*, October 1, 1955.

7 *The Contract Record*, October 24, 1917, 882. These same two animals were also intended to have occupied the 1917 stable: diphtheria and tetanus horses were stabled downstairs (with the addition of calves used for the production of small pox vaccine) and the guinea pig colony was to be housed in the hayloft, directly opposite an apartment for the resident lab technician's family. It appears, however, that the guinea pigs were instead housed in an outbuilding

8 For a discussion of the Connaught's fashioning of the heroic horse, see Joanna Dean, "Species at Risk: C. Tetani, the Horse, and the Human," in *Animal Metropolis: Histories of Human-Animal Relations in Urban Canada*, ed. Joanna Dean, Darcy Ingram, and Christabelle Sethna (Calgary, AB: University of Calgary Press, 2016).

9 Edmundo Morales, *The Guinea Pig: Healing, Food, and Ritual in the Andes* (University of Arizona Press, 1995).

10 They were described as early as 1554 by Konrad Gessler in his *Historia Animalium*. See, for example, the multi-coloured guinea pigs in paintings by Jan Brueghel the Elder: "Garden of Eden" (1610–12) and the "Entry of the Animals into Noah's Ark" (1615) in the Stapleton Collection, South West London, UK. Archeological findings at Hill Hall, Essex, provide evidence that guinea pigs were pets in middle class, as well as aristocratic families. Fabienne Pigière, Wim Van Neer, Cécile Ansieau, and Marceline Denis, "New Archaeozoological Evidence for the Introduction of the Guinea Pig to Europe," *Journal of Archaeological Science* 39, no. 4 (April 2012): 1020–24.

11 For the woodchuck, see Charles G. D. Roberts, *Babes of the Wild* (Toronto: Cassell, 1912), 64; for the beaver, see Charles Eden, *The Home of the Wolverene and Beaver, or, Fur-Hunting in the Wilds of Canada* (London: Society for Promoting Christian Knowledge, 1876) and for the chipmunk, see George Henry, *The Emigrant's Guide, or, Canada as It Is* (Quebec: W. Gray, 1835), 167.

12 Alexander Davidson, *The Canada Spelling Book*. (Toronto: Brewer, McPhail and Co., 1850), 15. See also Davidson's 1845 edition published in Niagara. An 1892 news article suggested that the Abyssinians at least were still a novelty: "A Big Show of Feathers: The Annual Exhibition of the Poultry, Pigeon and Pet Stock Association," *The [Montreal] Gazette*, June 28, 1892, 8. "Among the queer things were Abyssinian cavys."

13 Two novels that use the guinea pig in a pocket as a device are Marshall Saunders, *Beautiful Joe* (London: Jarrold, 1895), 164–65, and Alfred Tresidder Sheppard, *The Rise of Ledgar Dunstan* (Toronto: W. Briggs, 1916).

14 See, for example, the letters published in "The Boys Exchange," by sixteen-year-old Joseph S. Bricker of Listowel, Ontario, "How to Care for Cavies," *The Globe*, February 3, 1906, 10; "Fred's Pets," a letter from nine-year-old Fred Hodgkins in *The Globe*, December 7, 1907, 10; "Our New Baby," by ten-year-old Kenneth F. McCuaig of Toronto in *The Globe*, March 28, 1908, 10; and "Anah in King," by Anah Baldwin, aged nine, in *The Globe* October 24, 1908, 10. Boys are repeatedly associated with the guinea pig. It is the first of the pets described in *Three Hundred Things a Bright Boy Can Do* (Toronto: Musson, 1910). Lorne Sully's guinea pigs were reported as drawing special attention from "the small boy portion of the crowd," at the Russell County Fair, in *The Ottawa Journal*, September 15, 1892. The guinea pig is recommended as a class pet in *The Nature Study Course with Suggestions for Teaching It* (Toronto: Copp Clark, 1905).

15 "Pet Guinea Pigs," *Ottawa Journal*, October 22, 1898, 9. His letter was one of several sent in the hopes of winning a prize.

16 Evelyn Wade, "Our Guinea Pigs," in "Playtime Monthly Prizes," *The Globe*, April 15, 1913.

17 The advertisements for Newbro's Herpicide ran in many Canadian and American newspapers for several years. For an early Canadian example, see the *Ottawa Citizen*, August 1, 1905, 2. The guinea pig is rubbed with a pomade made of dandruff scales, and promptly loses its hair. The title in large font was a variation on the theme and appears in the *Ottawa Citizen*, November 30, 1907, 10.

18 *The Natural History of Quadrupeds and Cetaceous Animals from the Works of the Best Authors, Antient and Modern, Embellished with Numerous Plates*. vol. 2 (Bungay [England]: Brightly and Co., 1811). The quote refers to the guinea pig as a pet.

19 Elizabeth Stuart Phelps, *The Gates Ajar* (Cambridge, MA: Harvard University Press, 1869; 1964), 124. Cited in Philip Howell, "A Place for the Animal Dead: Pets, Pet Cemeteries and Animal Ethics in Late Victorian Britain," *Ethics, Place & Environment* 5, no. 1 (March 2002): 5–22.

20 *Three Hundred Things a Bright Boy Can Do*, 228.

21 J. Henri Wagner, *The Cavy: Our Fancy Guinea Pig* (Pet Stock World Company, 1915). Charles Eden was similarly disparaging when he compared the beaver to the guinea pig: "In shape it resembles a magnified guinea pig, but only in shape, and I should not degrade the intelligent beaver by comparing it to such a useless little animal did I know any other at all familiar to English readers." Eden, *The Home of the Wolverene and Beaver*, 64.

22 For the guinea pig market in Britain, see Robert G. W. Kirk, "A Brave New Animal for a Brave New World," *Isis* 101, no. 1 (March 2010): 62–94; and "'Wanted—Standard Guinea Pigs': Standardisation and the Experimental Animal Market in Britain ca. 1919–1947," *Studies in History and Philosophy of Biol & Biomed Sci* 39, no. 3 (2008): 280–91. For the United States, see the advice offered by the US Department of Agriculture in Orson N. Eaton, *The Guinea Pig*, USDA Leaflet 252 (1949) and *Raising Guinea Pigs*, Leaflet 466 (1962).

23 "Humble Guinea Pig is a Valuable Aid: Display at Winter Fair Recalls Use in Medical Research," *The Toronto Globe*, November 21, 1925. The *Ottawa Daily Citizen* reported prices in Boston as high as $150 a pair in "Odd Occupations," September 12, 1895, 3.

24 E. Michaels, *Cavy Culture: A Book of Practical Instructions on the Raising and Marketing of Guinea Pigs* (Philadelphia: E. Michaels, 1920), 71.

25 "Making More Money: The Big Problem That Interests Everyone – With Guinea Pigs," *The Windsor Star*, January 19, 1924, 28.

26 "Humble Guinea Pig is a Valuable Aid: Display at Winter Fair Recalls Use in Medical Research," *The Globe*, November 21, 1925.

27 In Britain, a guinea pig glut between 1948 and 1950 resulted in a price collapse, and then a shortage in 1951. Kirk, "A Brave New Animal for a Brave New World," footnote 24.

28 By 1949, the USDA pamphlet, *The Guinea Pig*, cautioned breeders to find a buyer before raising stock, because so many institutions raised their own, or contracted with specific breeders.

29 "Analysis of 342 Death Records of Breeding Female Guinea-pigs Period December 1930 – March 1933," Sanofi Pasteur Canada (Connaught Campus) Archives, Toronto.

30 H. Bruce and A. Parkes, "Feeding and breeding of laboratory animals III. Observations on the feeding of guinea-pigs," *Journal of Hygiene* 45, no. 1 (1947): 70–87. "The general level of requirement indicated by these experiments is vastly in excess of that of the rabbit, and the problem of meeting it, without feeding greenstuff, by a diet which can be made in bulk and stored under ordinary conditions, does not seem to have been attacked" (70). The vitamin was destroyed in the pelleting process, which was not a problem with rabbits as they synthesize their own vitamin C. The 1930s had been a period of general experimentation with processed food for laboratory animals (as with other livestock). Between 1930 and 1933, the Connaught Laboratories experimented with the guinea pig diet; they first fed them a wet mash of oats, middlings, bran wheat germ, casein, salt, and bone meal for eleven months, then a prepared rabbit chow for fifteen months, and then another dry mash similar to the wet one.

31 Kirk, "A Brave New Animal for a Brave New World," 15. Kirk cites the 1945 "Conference on the Supply of Experimental Animals," which was organized by a coalition of scientific organizations.

32 For example, see C. Cumberland, *The guinea pig or domestic cavy for food, fur and fancy* (London: Upcot, 1896); William F. Roth, and Charles T. Cornman, *Rabbit and Cavy Culture; a Complete and Official Standard of All the Rabbits and Cavies* (Sellersville, PA: Poultry Item Press, 1916); J. Henri.Wagner, *The Cavy: Our Fancy Guinea Pig* (Baltimore: Pet Stock World Company, 1915), and Michaels, *Cavy Culture*.

33 "Of Mice and Men," *Contox*, no. 16 (April 1969). Sanofi Pasteur Canada (Connaught Campus) Archives, Toronto.

34 Karen Rader, *Making Mice: Standardizing Animals for American Biomedical Research, 1900-1955* (Princeton University Press, 2004).

35 The method applied here is that described by Dr. E. Roux in "The Serum Treatment of Diptheria," *Dominion Medical Monthly* 4, no. 1 (January 1895): 8.

36 Michaels, *Cavy Culture*, 8.

37 "Toronto's New Laboratory is Best on the Continent," *The Toronto Daily Star*, May 8, 1912, 2.

38 Darcy Ingram, "Beastly Measures: Animal Welfare, Civil Society, and State Policy in Victorian Canada," *Journal of Canadian Studies/Revue d'études Canadiennes* 47, no. 1 (Winter 2013): 221–52. See also J. T. H. Connor,"Cruel Knives? Vivisection and Biomedical Research in Victorian English Canada," *Canadian Bulletin of Medical History* 14, no. 1 (1997): 37–64.

39 Details of the Society's founding meeting on 4 July 1921 were published in *The Canadian Theosophist*, September 15, 1921, 106. Flora Macdonald Denison had recently died. For the emergence of the organized antivivisection movement in Canada out of an antivaccination movement, see Joanna Dean, "Animal Matter: The Making of 'Pure Bovine Vaccine at the Connaught Laboratories and Farm at the Turn of the Century," in *Landscapes of Science*, E-book, ed. Tina Adcock (Toronto: Network in Canadian History and Environment, 2019).

40 E. Tennyson Smith's letter was published under the title "Vivisection," *The Toronto Daily Star*, March 25, 1918, 19. She identified herself as a visitor from England.

41 "Facts Figures Show the Value of Vivisection," *Toronto Daily Star*, September 25, 1922. Hasting's comments were made in response to a public lecture given by British antivivisectionist Walter P. Hadwen on September 21 and were run by the *Star* directly above a story about Hadwen's lecture.

42 See, for example, Richard M. Pearce, *Animal Experimentation in the Diagnosis, Treatment, and Prevention of Diseases of Children*. Defense of Research Series, Pamphlet XXVII (Bureau on Protection of the Medical Research of the Council on Health and Public Instruction of the American Medical Association, 1915), 6.

43 "General Hospital: The Adjourned Quarterly Meeting Held Yesterday," *The [Montreal] Gazette*, November 21, 1895, 6.

44 "Discussion Took Unexpected Turn: Anti Vivisectionist Protested Against Arguments at Chemical Society," *The [Montreal] Gazette*, October 30, 1923, 4. See also the letter by J. J. Heagerty, MD in the *Ottawa Citizen*, March 27, 1925, 18, describing the benefits of vaccination and concluding: "Mr. Franklin will still continue to prate largely. He will continue to gather around him gentle kindly folk and send delicious shivers up and down their spines, by picturing to them the terrible sufferings of motherless cats caused by dour visage surgeons whose hands are dyed red in the blood of innocent guinea pigs."

45 These quotes are taken from a 19 September 1926 article in the *Minneapolis Sunday Tribune*, called "The Microbe Hunters: Roux and Behring Massacre Guinea Pigs to Save Babies from Diphtheria." The first line of Chapter Three reads: "It was to save the babies that they killed so many guinea pigs." For the vast influence of this book on a generation of young microbiologists, and millions of general readers, see William C. Summers, "*Microbe Hunters* Revisited," *International Microbiology* 1 (1998): 65–66. This line of argument was not new. See also A. W. H. Bates, "Vivisection, Virtue Ethics, and the Law in 19th-Century Britain," *Journal of Animal Ethics* 4, no. 2 (2014): 30–44. Curiously, at the end of the chapter, Roux abandons science for sentiment when he administers his cure to human babies. Faced with the scientific mandate to treat half the babies in order to create a control group, Roux gives all the human babies the cure, rather than scientifically selecting half.

46 James Fitzgerald, *What Disturbs Our Blood: A Son's Quest to Redeem the Past* (Random House, 2010), 147, 400–1. A psychiatric report dated October 22 stated, "He continues to have numerous ideas about an unpardonable sin that he has committed" (401). Chapter Eight is titled. "The Unpardonable Sin." In an otherwise positive review, eminent medical historian Michael Bliss criticizes the book for "contrived melodrama" in his review in the *Canadian Bulletin of Medical History* 28, no. 2 (2011): 404. J. T. H. Connor's review in the *Canadian Historical Review* is also critical of the "flamboyant and journalistic prose," *Canadian Historical Review* 92, no. 4 (December 2011) 732–33.

47 *Merriam-Webster.com Thesaurus* defines the adjective "unpardonable" with reference to animal cruelty, s.v. "unpardonable," accessed June 20, 2021, https://www.merriam-webster.com/thesaurus/unpardonable. American antivivisectionist Mary E. Lovell described vivisection as "the worst form of cruelty and cruelty as the deadliest sin" Craig Buettinger, "Women and Antivivisection in Late Nineteenth-Century America," *Journal of Social History* 30, 4 [1997]: 863. On the first page of the *Sunday New York Times*, November 29, 1908, the popular writer Mrs. Humphrey Ward referred to vivisection as "the intolerable and unpardonable torture." Only two years before Fitzgerald's death, a Nobel prize–winning author wrote: "To a man whose mind is

free there is something even more intolerable in the sufferings of animals than in the sufferings of man. For with the latter it is at least admitted that suffering is evil and that the man who causes it is a criminal. But thousands of animals are uselessly butchered every day without a shadow of remorse. If any man were to refer to it, he would be thought ridiculous. And that is the unpardonable crime." Romain Rolland, *Jean Christophe*, trans. Gilbert Cannan (New York: The Modern Library, 1938).

48 See pages 207–8 of Fitzgerald's *What Disturbs the Blood* for the "violent and fatal reactions of the guinea pigs to injections of horse serum," and page 237: "Gerry instructs his sister to hold down a squealing guinea pig as he injects the antitoxin to test its potency." Neither reference is footnoted. On page 251, he describes the casual cruelty of one of Fitzgerald's mentors, Simon Flexner, quoting Flexner as saying: "No one can run an institution, unless he has the capacity to be cruel."

49 Robert Kirk, "The Experimental Animal," in *The Routledge Companion to Animal-Human History*, ed. Hilda Kean and Philip Howell (Oxford: Routledge, 2020), 134. Kirk says there is an urgent need for historical enquiry into "the question of how affective, moral and ethical values have been enacted within, and thus transformed by, animal research," and calls for "a moral ecology of science." As he notes, Vinciane Despret makes a similar point in "The body we care for: figures of anthro-zoo-genesis, *Body & Society* 10, no. 2 (2004): 111–34.

50 "Antivivisection," *The Globe,* April 6, 1923, 4.

51 "Loyalty to Early Friends Distinguishes Dr. Banting," *Toronto Daily Star*, November 20, 1923, 10.

52 "Anti-Vivisection Society Holds Its Annual Meeting," *The Globe,* February 1, 1923.

53 For the role of the Ottawa Anti-Vivisection Society in raising international condemnation see "Dr. Banting as a Dog Stealer," in *The Abolitionist*, February 1, 1924, 17, https://insulin.library.utoronto.ca/islandora/object/insulin%3AC10119. Medical historian Michael Bliss notes in his review of the Fitzgerald biography that "a very large number of Fitzgerald relatives, friends, and professional associates, including such giants of Canadian medicine as Banting and Best, were also mentally ill, unstable, and/or addicted to alcohol or drugs." *Canadian Bulletin of Medical History* 28, 2 (2011), 404–5.

54 Matthew Klingle, "The Multiple Lives of Marjorie: The Dogs of Toronto and the Co-Discovery of Insulin," *Environmental History* 23, no. 2 (2018): 368–82.

55 Susan E. Lederer, "Political Animals: The Shaping of Biomedical Research Literature in Twentieth Century America," *Isis: Journal of the History of Science in Society* 83 (1992), 29.

56 See J. C. Russell and D. C. Secord. "Holy Dogs and the Laboratory: Some Canadian Experiences with Animal Research." *Perspectives in Biology and Medicine* 28, no. 3 (1985): 374–81. As one example, the Montreal antivivisection group made reference to the suffering of the animals in the productions of serums, but explicitly focused their work on dogs. "Anti-Vivisection League Started," *The [Montreal] Gazette*, April 22, 1922, 6.