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From *The Principles* to the Animals (Scientific Procedures) Act. A Commentary on how and why the 3Rs became central to laboratory animal governance in the UK
Carrie Friese and Nathalie Nuyts

This special issue commemorates the upcoming 60th anniversary of the publication of Russell and Burch's *Principles of Humane Experimental Technique* (1959), where the concept of the 3Rs—replace, reduce and refine animals from life science research—was first introduced. As this special issue makes clear, the evolving impact of this book has not been at all straightforward. There have been clear breaks and ruptures between the commissioning of the book by the Universities Federation for Animal Welfare (UFAW), its implementation in the Animals (Scientific Procedures) Act (ASPA) in 1986 within the United Kingdom and the ways in which the 3Rs are now positioned as the—albeit contested (see McLeod and Hartley this issue)—transnational gold standard in laboratory animal welfare and ethics. The meaning and significance of the 3Rs has shifted along the way, coming to mean different things to different actors who operate within specific and thereby varying social-historical milieus or “contexts” (see Kirk this issue). This special issue opens a space to unpack the 3Rs through historical context, both by probing the development and use of the concept in experimental science and by addressing if and how this mode of governing laboratory animals is fit for purpose today and into the future.

Robert Kirk's article is particularly illuminating in this regard. Kirk provides a crucial historical analysis of *The Principles*, arguing that it must be understood within the “common culture” context of British academy, which dominated from the Victorian era until the middle of the 20th century. Kirk notes that the publication of *The Principles* coincided with the publication of a better-known text that articulated the demise of this ethos: C.P. Snow's “two cultures” that would rapidly come to typify the British academy and politics of knowledge more broadly. Kirk argues that *The Principles* languished in large part because it was written according to an outdated ethos of knowledge production, and in the process argued for an outdated scientific subject. His article makes an important contribution to the wider STS literature that explores how “culture” shapes the ways in which “ethics” travels, and does not travel (see also Prainsack and Wahlberg, 2011).

Nathalie Nuyts and I have begun to combine bibliometric, content and discourse analysis to better understand the time period between the publication of *The Principles* in 1959 and the implementation of the 3Rs into British law in 1986 with ASPA. In many ways paralleling the question that Kirk ends his article with, we have been asking how and why the 3Rs became so central to laboratory animal governance, given the relative obscurity of the original text.

To address this question, we undertook a bibliometric analysis of *The Principles* as cited in the two major laboratory animal science journals: *Alternatives to Laboratory Animals ATLA* and *Laboratory Animals*. We examined all indexed articles up to and including 2016, with ATLA articles available from its start in 1985 and *Laboratory Animals* articles available from 1977. Interestingly, the first article in *Laboratory Animals* citing *The Principles* appeared in 1985. Around half of all articles cluster together based on shared references, which we believe indicates a shared topical concern. By 1995, this cluster consisted of articles almost exclusively published by

authors who had some type of relationship with the UK based organization Fund for the Replacement of Animals in Medical Experiments (FRAME).

FRAME was founded in 1969 by Mrs. Dorothy Hegarty and Dr. Charles Foister. Hegarty had opposed the use of laboratory animals through her participation in antivivisection groups; however, she believed that medical research was both important and could not yet be done without animals. Hegarty was also critical of the "emotional approach" taken by anti-vivisectionists (see Druglitrø, this issue, on "the logic of the heart" promoted by animal rights advocates). With FRAME, Hegarty wanted to follow a scientific approach, informing the scientific community and the larger public about "alternatives" to animal models that were already available. As Hegarty was not a scientist herself, she collaborated with Dr. Foister (Michael Balls 1995; Hegarty 1995). And it was Dr. Foister who reportedly introduced Hegarty to *The Principles* (Annett 1995). It appears that FRAME's efforts were crucial in making the 3Rs part of how laboratory animals are regulated in the UK.

The ethos of FRAME in many ways parallels UFAW, as discussed by Kirk (this issue), and the scientists discussed by Druglitrø (this issue), with the focus on science and a refusal to invoke emotionalism. But FRAME's focus was specifically on promoting "alternatives" to animals in scientific research—or what scientists referred to as replacements—as a different kind of animal activist group. As such, FRAME would not have helped to generate the focus on animal welfare and laboratory animal science described by Kirk and Tone Druglitrø in this special issue. Rather, FRAME is a site where (some) animal rights activism sought to strategically and pragmatically align with scientists, exemplifying what STS has taught us regarding science and activism.

Further, FRAME's focus on "alternatives" goes some way in providing a mechanism for the survival of the 3Rs, questioned by Kirk in the conclusion to his article (this issue). Kirk notes that the 3Rs persisted despite the obscurity of the original text in part because the principle of replacement offered a fresh approach for antivivisectionists, with the National Antivivisection Society, the British Union for the Abolition of Vivisection and the Scottish Society for the Prevention of Vivisection all taking up the discourse of "alternatives" as a means to curtail animal research. FRAME provides a link between activists' focus on "alternatives" and scientific inclusion of "replacement." FRAME may therefore be a key mechanism in forging the typically British compromise that Kirk notes in his concluding remarks regarding the significance of the 3Rs in Britain.

Tone Druglitrø's paper importantly shows that creating a science of laboratory animals was a transnational effort, and so while the 3Rs is uniquely British in some important ways it is also a transnational development through its links with laboratory animal science. Our preliminary bibliometric analysis concurs with Druglitrø's argument. The analysis shows that the two authors who published the most on particular scientific developments contributing to the 3Rs are Finnish scholars involved in creating laboratory animal science (Nevalainen from the University of Eastern Finland and Kasanen from the University of Kuopio). But FRAME members and Russell himself dominate the more general discussions about the 3Rs.

The links between the 3Rs and laboratory animal science help explain why the articles in this special issue go beyond the narrowly defined space of the experiment. While the 3Rs was developed to "diminish inhumanity in experimentation" (Russell and Burch, 1959: see Kirk in this issue), specifically in creating a scientist subject who is humane to animals, much of the special issue goes well beyond the scientist per se. The science of laboratory animals and the welfare of animals in a broader societal context—or what Hobson-West calls “societal sentience” in this issue—is the overall focus; veterinarians (Druglitrø this issue; Hobson-West this issue), animal technicians (Greenhough and Roe this issue; Hobson-West this issue) and lay publics (McLeod and Hartley this issue; Hobson-West this issue) are as much the subject of this special issue—as possibly more of the subject—than the scientists conducting animal experimentation.

McLeod and Hartley’s article (this issue) helps explain why this is the case. They compare and contrast the notion of the 3Rs to the more recently developed notion of responsible research and innovation. In doing so, they call for a broader range of actors to be involved in the political dimensions of animal research. In other words, they view Russell and Burch’s focus on scientists and the experiment as a limitation to the 3Rs as an ethical framework, at least according to contemporary standards. Meanwhile Greenhough and Roe (this issue) argue that animal technicians need to be empowered institutionally in order to exceed the minimum requirements of the 3Rs. And Hobson-West evokes the salience of public imaginaries regarding animals for the practices that occur within the animal house. Together, these papers show how the 3Rs must exceed the boundaries that *The Principles* was founded upon. *The Principles* was founded upon a separation between the science of animal welfare and the science that uses laboratory animals, a separation that is consistently troubled across this special issue. Indeed, the papers argue that reproducing this division may be a key barrier to improving the care and welfare of laboratory animals today (Greenhough and Roe this issue).

At the center of these papers is the question of how “good” care can be delivered as part of science that uses animals in its knowledge practices (see also Friese, 2013). The idea of “the good” is explored explicitly in both Greenhough and Roe (this issue) and Druglitrø (this issue). But all the papers in this special issue emphasize that the 3Rs is a key discourse and practice through which the good is pursued in experimental science involving animals, if not *the* discourse through which the good is pursued. This special issue explores the meaning of the 3Rs in order to push its boundaries and improve the wellbeing of laboratory animals.

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