
THE WISDOM OF RUSSELL AND BURCH

20. On Replacing the Concept of Replacement

Michael Balls

In The Principles of Humane Experimental Technique, Russell and Burch gave us the Three Rs concept – but more important than this was their gift of The Humanity Criterion

This will be my final *Wisdom of Russell and Burch* comment for PiLAS. I cannot know how widely the first 19 *Wisdoms* have been read, or whether they have influenced anybody else's thinking about the issues raised in *The Principles of Humane Experimental Technique*.¹ What I can say, however, is that writing them has been a most enjoyable and highly meaningful experience for me.

I have tried to understand what thoughts and ideas Russell and Burch wanted to convey in 1959, in a world which, in many ways, was very different from the world of the biomedical sciences as we know it today. On the other hand, despite the breath-taking technical advances and the aura of sophistication that have such a powerful influence in 2015, politically and socially, as well as scientifically, many of the fundamental doubts are still with us, and many challenging questions still await satisfactory answers.

Sadly, the biomedical sciences remain remarkably dependent on the use of animals as models or surrogates for humans, without sufficient recognition of the basic principles of modelling or of the vital importance of the specific factors, lifestyle features and evolutionary adaptations which make animals so very different from ourselves. Many otherwise eminent scientists continue to be willing to turn a blind eye to truth of the high-fidelity fallacy.²

Nevertheless, as I said in Prague in 2014 at the *9th World Congress on Alternatives and Animal Use in the Life Sciences*,³ I think the time is approaching when we should say farewell to the Three Rs concept, which has, or at least should have, served its purpose. If it hasn't, then continuing to appear to accept it while continuing to rely on animal experimentation, as hitherto, will be of little value. I say this for two reasons.

First, because *Reduction* is really about good experimental design and the proper analysis of outcomes, the necessity of which should be assumed and universally recognised, without the need to campaign for it. Similarly, *Refinement* is about treating animals

properly, within and outside experiments, as much for the sake of the science as for the welfare of the animals. As for *Replacement*, now perhaps belatedly seen by some as the 'One R', it shouldn't really be about substituting animal procedures at all.

Up to now, *Replacement* methods have all-too-often been seen as mere adjuncts to the premier and dominating approach in biomedical research and testing – namely, the use of rodents and, where it can be afforded, the use of dogs and non-human primates. However, such an emphasis demeans the scientifically-advanced non-animal *in vitro* and *in silico* systems and ethically-acceptable and safe *in vivo* procedures involving humans themselves, which deserve to be welcomed and accepted in their own right, since they involve modern molecular biology and computational science, and can offer directly human-oriented insights and understanding of humans, in support of effective treatments, which animal procedures have never been able to provide, and could never be able to provide.

Secondly, the need to fundamentally change our approach to biomedical research and testing should not focus so heavily on animal suffering and its avoidance. A strong argument can be made in support of the view that humans are also suffering greatly, because of the inability of the traditional animal-based approach to medical research to provide what is needed in terms of the understanding of human diseases, the efficacy of pharmaceuticals and other therapies, and the avoidance of the adverse effects of chemicals and chemical products of various kinds. That is why I believe that we should say *Goodbye* to the Three Rs and *Hello* to humanity, for the benefit of humans and animals alike, recognising that the greatest gift Russell and Burch gave us in *The Principles* was not the Three Rs concept, but *The Humanity Criterion*, expressed like this: *If we are to use a criterion for choosing experiments, that of humanity is the best we could possibly invent. The greatest scientific experiments have always been the*

most humane and attractive, conveying that sense of beauty and elegance which is the essence of science at its most successful.

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References

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- ² Balls, M. (2013). The Wisdom of Russell and Burch. 3. Fidelity and discrimination. *ATLA* 41, P12-P14.
- ³ Balls, M. (2014). Animal experimentation and alternatives: Time to say goodbye to the Three Rs and hello to humanity? *ATLA* 42, 327-333.

Since 2012, Michael Balls has written the following short articles on *The Wisdom of Russell and Burch* for each issue of the *PiLAS* supplement.

| Title | Citation |
|--|-----------------------------------|
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| 2. <i>The Wages of Inhumanity.</i> | <i>ATLA</i> 40, P28-P29, 2012 |
| 3. <i>Fidelity and Discrimination</i> | <i>ATLA</i> 41, P12-P13, 2013 |
| 4. <i>Reduction</i> | <i>ATLA</i> 41, P24-P25, 2013 |
| 5. <i>Refinement</i> | <i>ATLA</i> 41, P36-P37, 2013 |
| 6. <i>Replacement</i> | <i>ATLA</i> 41, P52-P53, 2013 |
| 7. <i>The Factors Governing Progress</i> | <i>ATLA</i> 41, P68-P69, 2013 |
| 8. <i>UFAW and Major Charles Hume</i> | <i>ATLA</i> 41, P82-P84, 2013 |
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| 10. <i>The Use of Lower Organisms</i> | <i>ATLA</i> 42, P23-P24, 2014 |
| 11. <i>The Analysis of Direct Inhumanity</i> | <i>ATLA</i> 42, P35-P36, 2014 |
| 12. <i>William Russell: Polymath, Wordsmith, Classicist and Humourist</i> | <i>ATLA</i> 42, P46-P48, 2014 |
| 13. <i>Rex Leonard Burch: Humane Scientist and Gentle Man</i> | <i>ATLA</i> 42, P57-P59, 2014 |
| 14. <i>On the Proper Application of Appropriate Statistical Methods</i> | <i>ATLA</i> 42, P65-P67, 2014 |
| 15. <i>Comparative Substitution</i> | <i>ATLA</i> 43, P11-P12, 2015 P11 |
| 16. <i>The Three Rs: The Way Forward</i> | <i>ATLA</i> 43, P25-P27, 2015 |
| 17. <i>The Choice of Procedures</i> | <i>ATLA</i> 43, P37-P38, 2015 |
| 18. <i>Rationalisation and Intellectualisation</i> | <i>ATLA</i> 43, P49-P50, 2015 |
| 19. <i>Russell and Burch after 1959</i> | <i>ATLA</i> 43, P59-P60, 2015 |
| 20. <i>On Replacing the Concept of Replacement</i> | <i>ATLA</i> 43, 2015 |