

## Forward

I know that I speak for both old and new devotees of bacteriophage when I say that this book has been wanted and needed for a very long time. An entire generation of graduate students has gone on to become department chairs since the last version of *The Bacteriophages*. In a real sense, the field of bacteriophage biology died, was buried and plowed under, but is now arising again as vigorous fresh green shoots from the soil so thoroughly enriched. The evidence of its death is indisputable. If you do a CRISP search of the NIH grant database CRISP for grants with “bacteriophage” in the title for the years 1972 and 2002, the numbers come up approximately the same, above 200. However, a closer look reveals that most of the projects funded by NIH in 1972 involved research in which plaques were generated every week in the natural course of experimentation. When I looked through the grants funded in 2002, and put aside phage display and other library implementations, I could find less than 10 and I know for certain that several of these have expired since then. In the 1970’s, the Cold Spring Harbor “Phage” meetings were basically all about some aspect of bacteriophage biology; now, the meeting is still affectionately called “Phage” but I can tell you as an organizer that it is a struggle to fill up even one evening session of a six day conference with vaguely phage-related talks.

It should be a topic of some interest for science historians to explain how a field with so much momentum and so many talented practitioners suddenly turned its own lights off and just walked out the door. It was an exodus of talent and leadership of a scale, breadth, and suddenness never seen before in any field of biology, and perhaps in any field of modern science. My own theory is that the classical era of phage biology had at its core a suicidal impulse derived from physicists’ reductionism. Others have suggested to me that the very success of molecular genetics, much of which

Forward, [\*The Bacteriophages\*](#) 2<sup>nd</sup> edition, R. Calendar (ed), Oxford University Press

was concerned with phage during the golden era, led to a kind of arrogance of invincibility and thus to a fearless rush to harvest the low hanging fruit in eukaryotic systems. Perhaps it also was alluring to be in the founding circle for new study sections, where presumably the competition would be much less intense.

In any case, there is a new phage biology emerging. In this new phage biology, the interest in the phages themselves, not just in phages as a convenient system to learn new rules of molecular biology. The latter impulse is still alive, but its few remaining active adherents are mostly at or nearing retirement or bypass age. The new crowd of phage people come from all directions, not always intentionally. Phage are now being re-discovered as marvelous subjects for nano-science (hardly a surprise to any kid who has ever seen a drawing of phage T4!). It also turns out, *mirabile dictu*, that phage are involved in many aspects of bacterial evolution and pathogenesis; indeed, many diseases and most dissemination of virulence factors are basically phage phenomena, despite the decades-long near absolute refusal of funding agencies to consider phage relevant to human disease. Moreover, phage are now being found to be sources of genetic information useful in combating drug-resistant pathogens, which should have been obvious long ago. In fact, much of this volume is written by members of the new wave. And, not least, phage are now being tamed and harnessed themselves as therapeutic agents, more than half a century after d'Herelle's lonely, ostracized demise.

Which brings us full circle back to this book. Have you ever tried to find an up to date, comprehensive compendium of phage biology? Well, until now, you had very few choices, and most of them were out of print. As you will see, many of the chapters of this book are written by recognizable veterans of the classical phage years, but also many are written by new practitioners, some of whom didn't arrive at this juncture intentionally. They

Forward, [\*The Bacteriophages\*](#) 2<sup>nd</sup> edition, R. Calendar (ed), Oxford University Press

simply followed the science, and the science of microbiology is now coming back, full circle, to bacteriophage.

Enjoy.

Ry Young