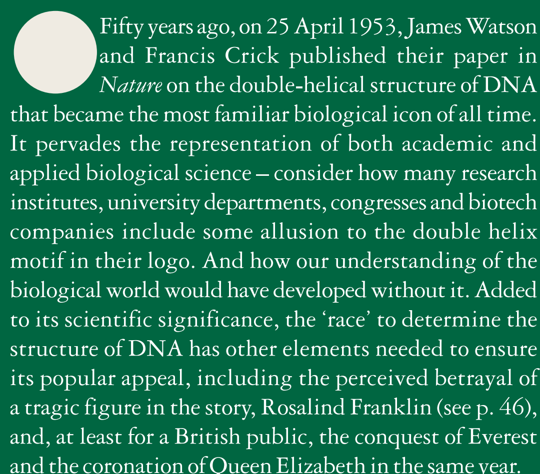
DNA 50: then and now

David Hopwood



● Fifty years ago, on 25 April 1953, James Watson and Francis Crick published their paper in *Nature* on the double-helical structure of DNA that became the most familiar biological icon of all time. It pervades the representation of both academic and applied biological science – consider how many research institutes, university departments, congresses and biotech companies include some allusion to the double helix motif in their logo. And how our understanding of the biological world would have developed without it. Added to its scientific significance, the 'race' to determine the structure of DNA has other elements needed to ensure its popular appeal, including the perceived betrayal of a tragic figure in the story, Rosalind Franklin (see p. 46), and, at least for a British public, the conquest of Everest and the coronation of Queen Elizabeth in the same year.

Along with countless other organizations, the SGM is recognizing the 50th anniversary, in our case with this special issue of *Microbiology Today* and with the Society's 153rd meeting, at UMIST in September, largely devoted to the scientific legacy of the Watson and Crick discovery. Petra Oyston and her co-organizers describe the main symposium at that meeting – *Bases to Megabases in 50 Years*. It should be a great meeting. It happens to be my last as President of the Society and I hope lots of people will recognize it as a 'must', either to catch up on new developments for their own research or to fill in gaps for their course teaching.

The SGM has recently begun to include a History of Microbiology lecture in the programme of its September meetings, and Colin Howard, who gave the first of these lectures in 2000, has summarized his theme in this issue of *Microbiology Today*. Before this, John Postgate, almost a household name for his book *Microbes and Man*, wrote the only comprehensive account of the history of the Society on the occasion of its Golden Jubilee in 1995. It is therefore completely appropriate that he introduces this special issue with a retrospective account of the first link between Watson and Crick – in the person of a young Jim Watson – and the SGM. It seems that it didn't go too well but, not for the first time and certainly not for the last, the occasion was rescued over alcoholic drinks in the evening! For those who would like a definitive history of the post-war events that led to the DNA structure and from there to the rise of the Laboratory of Molecular Biology in Cambridge as a world leader in the new field of science, Soraya de Chadarevian's book *Designs for Life: Molecular Biology after World War II*, which I review on page 46, is highly recommended. She will be giving this year's History of Microbiology lecture at the UMIST meeting, fitting in perfectly with the meeting's theme.

This issue contains articles that resonate with the Watson and Crick discovery in several interesting ways. As Peter Strike points out, the basic mechanisms of DNA replication and mutation were famously adumbrated in the classic 1953 papers, but DNA repair was not. He traces the development of our understanding of this key aspect of the genetic material of all cells. It parallels the amazing growth in our understanding of molecular biology in general and still has its share of unsolved mysteries. Again, as Mike Mayo reminds us, RNA replication was hardly covered in 1953, yet it is central to the existence of a clear majority of viruses. It is much less faithful than DNA replication, probably accounting for the choice of DNA by all (complete) organisms, but is exploited by viruses to aid their phenomenally rapid evolution. And gene therapy of human disease, to be rational and effective, depends on a knowledge of the genomes of viruses – the vectors for introduced genes – as well as the host. As Stacey Efstathiou tells us, this is one of the most challenging fields for applying the legacy of Watson and Crick, for both scientific and ethical reasons, but things are certainly happening.

Today there is a flood of whole microbial genome sequences hitting the databases at an ever-increasing rate. Stephen Bentley puts a numerical perspective on this and conveys some of the excitement of entering a genomic Aladdin's Cave and switching on the floodlights. Once the DNA of any microbe is sequenced it is hard to imagine working on its genetics without it. What about our ability to make sense of all this information? Many people have written suites of software to make this possible, and most of them certainly have things to offer the microbiologist who is not a genomics specialist but wants to find out as much as possible about the genetic endowment of their favourite microbes, including the genetic relationships with sequenced relatives. Some of the best 'free' packages have come out of the Sanger Institute, and members of SGM have been fortunate in 2002 to have been able to attend hands-on courses about two such packages, Artemis and the Artemis Comparison Tool, from the Sanger experts. As Nick Thomson describes, the courses provided excellent occasions for learning, and it is gratifying to read that the instructors felt that they had also benefited from the chance to discuss the software with users knowledgeable about some of the microbes whose genomes they had annotated. For my own part, I am especially pleased that this new SGM-sponsored initiative has fulfilled a dual aim of the Council: to do our bit in the genomics field, and to kick off a new policy of holding workshops and other events in the regions. There will be more regional genomics workshops in 2003. Watch this space for news of other regional activities that are in the planning stage.

● *Sir David Hopwood, FRS, is SGM President and his group has recently collaborated with the Sanger Institute to sequence the Streptomyces coelicolor genome. He may be contacted at John Innes Centre, Norwich Research Park, Colney, Norwich NR4 7UH, UK.*
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