The Man Who Invented the Chromosome: A Life of Cyril Darlington

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If you are interested in why the great Bateson so long denied the existence of inheritance through chromosomes, if you want to know how it was that genetics research moved from England to the United States in the early part of the last century and how early investigators struggled to understand the mechanism through which traits are inherited, then this book is for you. With meticulous research and much attention to detail, Oren Harman traces these early days of genetic research through an exhaustive review of documents that he researched in England. The very dreary life of Darlington’s youth, his dour family life and overbearing father, as well as the accident that led him to become a volunteer in Bateson’s botanical research empire are beautifully laid before us. After Bateson’s death, Darlington came under the strong influence and tutelage of the successor to the Botanical Institute (the “John Innes”), the great Haldane, or J.B.S. as he is commonly referred to. While Haldane was not a cytologist, his great eminence was to have a major influence on Darlington’s development as a scientist; he was sent to Persia for (largely unsuccessful) collection of specimens, but the new leadership allowed him to pursue his studies on the explanation for meiosis and, especially, he focused on chiasma formation and the segregation of chromosomes. Returning from this long voyage through the near east and Russia, Darlington recovered from malaria and sundry illnesses, but his career as a scientist now got under way in earnest. Chiasmata, meiosis, and mitosis occupied his principal attention, and these efforts culminated in the 1932 publication of Recent Advances in Cytology. It created enormous controversy among the most prominent geneticists, aspects that Darlington personally experienced on his travels to the United States and the Far East. But also, the book placed him among leading thinkers of then prominent geneticists. The book was widely read and discussed; it is a tribute to the very young age at which it was written.

A new phase of Darlington’s life began when he became the director of the “John Innes,” chosen over Haldane who had been his close friend and advisor. In part this resulted from their different political ideologies, as these had now become most important aspects in genetics. Stalin’s repressive regime had forced many Russian institutes to close, and many of his personal friends disappeared or were persecuted, thus Darlington became politically active. As a new prominent scientist, he attacked the Russian government’s actions and denounced Lysenko and the new communistic genetics. He made few friends at first, and many of his speeches and publications were rejected, but ultimately Darlington was proven right in his views of communism as well as Nazism. Not only did he denounce the communistic doctrine, he became an outspoken defender for freedom in scientific research and suffered many personal attacks in publications and after giving speeches. He took on the current British establishment and sought a new direction for research activities, one that was not controlled by the government, and in which scientists were free to choose their own direction. This chapter is particularly relevant now when we observe the contemporary struggle between the public and government on the merits of stem cell research. When Darlington concluded that the breadth of “human variety” was the result of genetic determinism, Hogben suggested in 1949 that one might profitably recall the remarks of Einstein in letters to Freud:

How is it possible to control man’s mental evolution so as to make him proof against the psychoses of hate and destructiveness? Here I am thinking by no means only of the so-called uncultured masses. Experience proves that it is rather the so-called intellektualizti that is most apt to yield to these disastrous collective suggestions, since the intellectual has no direct contact with life in the raw but encounters it in its easiest synthetic form—the printed page.

And so Darlington became obsessed with the fate, the determinism, with “hybridity” of man and waged a constant battle to make his views heard. Regrettably, he thought, one cannot experiment with man as with plants, but how much he would have loved to have known the outcome of his fathering a child with a Turk, etc. Increasingly he devoted his efforts to bring his understanding of race development into line with his insights on plant breeding. He began to espouse cytoplasmic inheritance and was therefore criticized for Lamarckianism, a concept that he had fought for so long. Finding it ever harder to have his papers accepted in journals where he wished to have his views published, he created his own journal, Heredity, with Fischer, and was now able to write anything he wished. The culmination of his writings is the publication of an important trilogy of books (1953, 1969, and 1978) which he considered to be “the pinnacle of his career.” Darlington had become a spokesperson for social engineering, even eugenics, based on his strong background in genetics. But “John Innes” was now too stifling, too narrow a place for him to work, and he was appointed as professor of botany at Oxford. The faculty was stunned. The consequence was rapid replacement of faculty and a completely new orientation in the department. But Darlington was aging, gradually realizing that genes were in the process of supplanting chromosomes as topics of molecular biology; his time in the sun had passed. Thus he devoted the last few years of his life to sociopolitical writings, reawakening the furor of races, causing much outcry against his views. Darlington strove valiantly to have the different human “races” understood as evolutionary units, much as his plants had dictated. He tied these evolutionary units to the varied cultures of man—it did not sell well. Yes, Darlington was a controversial person, and he thrived on it. He awakened discussion and controversy, all of which is synthesized in the final chapter of this book. This chapter brings together all of Darlington’s controversies and achievements; it is perhaps the most interesting part of the book. But, in itself it depends...
heavily on the preceding chapters. I should also mention that the book is meticulously annotated and the letters and comments in the appendix are, themselves, worthy of a good look.

This is an astonishing account of a free spirit in genetic science, of a man who might otherwise be easily overlooked. It is about his struggles to have novel ideas adopted and it is worthy of a close read by current geneticists, if only to better understand the struggles before the true genetic units became understood. It brings to our eyes the gradual development of an understanding of inheritance and it accounts for the many scientists from different continents of whom we know all too little, other than something of their basic scientific contributions. It brings them to life as politicians, as well as scientists, as spokespersons or detractors, but without casting a real value judgment. Of course, Darlington did not invent the chromosome as the title suggests. Its name and recognition long antedated this botanist. But Darlington enabled a broader view of the relation of chromosomes and genetics; he defined the manner of genetic exchange and sex determination, all basically deduced by his early meticulous studies of the chromosomal behavior in many plant species.

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