Book review

The Tangled Field

Nathaniel C Comfort

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In his *The Tangled Field*, Nathaniel Comfort tells us the story of the discovery and recognition of transposable genes proposed for the first time by Barbara McClintock (1902–1992) while studying genes for the color of maize kernels. One of the first important results obtained by McClintock by the 1930s was to show that contrary to what was commonly believed, the meiotic chromosomes (during prophase) are an excellent material to study chromosome morphology. Each member of the meiotic chromosomal complement could easily be distinguished by its arm length and form. This discovery opened the door to the integration of plant breeding experiments with chromosome analysis. Also in the 1930s, McClintock discovered crossing over in maize. In the 1940s she proposed gene mobility and its possible effects in gene expression; she pointed out that genes were not aligned in chromosomes like 'beads on a string', but can move and change their position. She described and located the first jumping gene in the short arm of chromosome number 9.

In Evelyn Fox Keller's book *A Feeling for the Organism*, the life and work of Barbara McClintock have been described as a struggle for acceptance in male-dominated fields, as a journey through professional setbacks, financial hardship and humiliation, to finally become a symbol of female discrimination in science. Comfort tells us that this myth soon became a sentimental fancy: her science was non-masculine, holistic, intuitive, non-reductionist and non-interventionist. After she was granted the Nobel Prize in 1983, Barbara McClintock's myth became even fancier: she was a prophet, a brilliant loner, a rediscovered genius.

Comfort tries to show, may I say with great success, that this myth should be separated from reality. This book shows us that 'behind the mask' created after the Nobel Prize, we have a great rigorous and logical experimentalist, an idiosyncratic and highly original human being. Her science was neither 'feminist' nor 'marginal'. She had the recognition of her peers and was a valuable member of the scientific community at the time. Even more, Comfort portrayed McClintock as one who played an active role in the formation of her own reputation.

Although her work comprised two different types of phenomena: genetic control and transposition, Comfort tells us how important genetic control was in McClintock's work. Her main interest, at the time she discovered transposition, was to find the source of developmental control – transposition could explain this control. Although her vision of genetic control has not been accepted, transposition was the key to the understanding of certain aspects of genetic behaviour at the phenotypic level. McClintock's idea of transposition aimed to explain the somatic regularities of variegation and mosaicism in relation to the material chromosome configurations during mitosis. Also, transposition or the movement of genes, explained the occurrence of aberrations as a consequence of unstable genes, in turn related to the origin of mutable genes. For McClintock, transposition was such an integrative mechanism that it could account for all the numerous, seemingly complex types of phenomena occurring at different levels of organization.

The Tangled Field is well worth reading. It can help us to understand the way science is constructed, how scientists' create myths and their meaning, and of course, important aspects of the genetic mechanisms involved in the living world.

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