John Innes Centre

Article Definition: The John Innes Centre is a leading European Centre for research into horticultural science. It is named after John Innes and its most famous work is the development of a brand of compost. The Centre was formed by the merger of three institutions, the John Innes Institute, the Plant Breeding Institute and the Nitrogen Fixation Laboratory.

Key Words: John Innes, horticultural research, compost, genetics, nitrogen fixation.

Contents: Introduction, John Innes Institute, Plant Breeding Institute, Nitrogen Fixation Laboratory.

Introduction: The John Innes Centre (see figure 1) is a leading centre for horticultural research in Europe. It is a registered charity and company by guarantee. Its major aims are to research plant biology and microbes and to train scientists. Though it is supported by over forty organisations, the majority of its income comes from the Biotechnology and Biological Sciences Research Council. It employs nearly 900 staff at a site in Norwich and was created in 1994 by the amalgamation of the John Innes Institute, the Plant Breeding Institute and the Nitrogen Fixation Laboratory. **<Figure 1 near here>**

1. John Innes Institute

1.1 Who was John Innes?

John Innes was a successful Victorian businessman, who developed city properties with his brother James. Innes died in 1904, leaving £325,000 for various charitable bequests, including the establishment of a horticultural school. Innes's will came to the attention of the Board of Agriculture, who offered to help establish a horticultural institute. The Trustees accepted the offer despite the emphasis that the Board placed on the institute's research function. In 1910 the John Innes Horticultural Institution (JIHI) opened on five acres of land adjoining Innes's old home in Merton. The Institution moved to Bayfordbury in 1949 and to Norwich in 1967, when it changed its name to the John Innes Institute.

1.2 John Innes Compost

The name "John Innes" is most closely associated with compost. Research into composts began at the Institution in the 1930s after very poor germination rates were gained from compost sterilized by normal trade methods. The Institution's Curator, William Lawrence, and John Newell began to experiment with methods of sterilising soil, and into the desirable composition, pH and temperature of compost.

The formulae of John Innes composts was decided by 1939 and the outbreak of World War Two led the Institution to concentrate on improving Britain's food production. Information on the compost was widely disseminated via lectures and leaflets. However, the composts were never manufactured at the Institution and it has not benefited financially from them.

1.3 JIHI and Basic Science

Though the JIHI was a horticultural research institute, it always focused on basic scientific research. In particular, it has an important place in the history of genetics. The first director of the JIHI, William Bateson, was the most vocal and influential advocate of genetics in Britain at the start of the twentieth century. When Bateson moved from Cambridge University to the JIHI in 1910, most of his researchers and the centre of British genetics moved with him. **See also 3094, 2359.**

Following Bateson's death in 1926, the Institution's predominance of British genetics continued. In part this was due to the reputations of those in-charge. The next director, A.D. Hall, was a well-reputed agricultural chemist. He knew little of genetics and so recruited the renowned mathematical geneticist, J.B.S. Haldane, who oversaw groundbreaking work on the biochemistry of flower colours. The following director was the famous cytogeneticist, Cyril Darlington, who built up a world-class cytogenetics group during the 1940s and 1950s. **See also 2533, a0006241.**

During the 1960s the Institution changed its focus towards biochemistry and molecular studies and so sought a close relationship with a university. In 1967 it gained links to the University of East Anglia. The Institute has increased in size since the 1980s with the arrival of not only the Plant Breeding Institute and Nitrogen Fixation Laboratory, but also the Sainsbury Laboratory, Plant Bioscience Limited and the Norwich BioIncubator, which are located on the same site.

2. Plant Breeding Institute (PBI)

Though the PBI also has important links to genetics in its history, its research had a far more practical focus than that at the JIHI. The Institute was founded by the Development Commission, which was established to develop the rural economy in the wake of the agricultural depression of the late nineteenth and early twentieth centuries. The Commission decided to establish a rational system of agricultural research stations in Britain. One of the first stations to be established was the PBI at Cambridge University in 1912.

The Institute's first director was the plant breeder, Rowland Biffen, who specialized in wheat breeding, an important crop in East Anglia. Biffen developed new wheat breeds (such as Little Joss and Yeoman) by applying genetic knowledge to the technique of cross-breeding. The PBI was not intended as a profit-making institute and thus in 1919 the National Institute of Agricultural Botany was established to commercially develop and market breeds developed by the PBI.

The PBI severed its links to Cambridge University in 1948, becoming an Agricultural Research Council (ARC) institute. Throughout the 1950s the crops developed at the PBI expanded but the focus of the work remained almost entirely practical until the 1970s, when DNA studies of wheat began. In the 1980s a new department of molecular genetics was added.

In 1987 the PBI's farm and breeding programmes were sold to Unilever. The remaining basic researchers relocated to the John Innes Institute site at Norwich

where they worked as the ‘Cambridge Laboratory’, prior to the merger into the John Innes Centre.

3. Nitrogen Fixation Laboratory (NFL)

In the early 1960s the ARC decided to found a unit investigating the basic chemical processes in nitrogen fixation. They recruited a leading inorganic chemist, Joseph Chatt, to direct the unit and a microbiologist, John Postgate, to lead the biological research. Following its foundation in 1963, the chemists worked at Queen Mary College and the biologists at the Royal Veterinary College, before a common research space was created at the University of Sussex in 1965.

The Nitrogen Fixation Unit quickly became a world-leader, admired for its interdisciplinary approach. At its peak it had 45 staff members and over 35 visitors. On the retirement of an ARC unit’s director, it was normal for them to be disbanded. However, when Chatt retired in 1980, Postgate was made director. Although the unit was officially disbanded on Postgate’s retirement in 1987, it actually moved to the John Innes site in Norwich and became the NFL, prior to the merger into the John Innes Centre.

Further Reading:

Lawrence, W.J.C. 1980. Catch the Tide: Adventures in Horticultural Research. Grower Books: London.
Olby, R. 1989. “Scientists and Bureaucrats in the Establishment of the John Innes Horticultural Institution under William Bateson.” Annals of Science 46: 497-510.
Olby, R. 1991. “Social Imperialism and State Support for Agricultural Research in Edwardian Britain.” Annals of Science 48: 509-526.
Palladino, P. 2002. “Plants, Genetics and the Modern State.” Plants, patients and the historian: (Re)membering in the age of genetic engineering, pp. 34-69. Manchester University Press: Manchester.
Postgate, J. 1998. “The Origins of the Unit of Nitrogen Fixation at the University of Sussex.” Notes and Records of the Royal Society of London 52: 355-362.

Glossary:
biochemistry: the scientific study of chemical processes in organisms.
cross-breeding: breeding by mating individuals from two different species or varieties.
cytogenetics: the interdisciplinary study of cytology and genetics, particularly the study of the chromosomes.
genetics: the scientific study of heredity and variation.
horticulture: the growth of plants in gardens, particularly fruit, vegetables and flowers.
microbes: a very small organism.

Figure Captions:
Figure 1: An aerial view of the John Innes Centre in 2006. Provided courtesy of the John Innes Centre.