THE PLANTAGE QUARTER IN AMSTERDAM, ITS DEVELOPMENT AND IMPORTANCE FOR SCIENCE AND HIGHER EDUCATION

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In 1982 the Plantage quarter and its Botanical Garden (the "Hortus") in Amsterdam were 300 years of age, and higher education in that city was even older, viz. 350 years. It seems a good time to have a look at the history of this part of Amsterdam that has been so important to science.

In 1682 the city intended to go ahead with its plans for extension, but it was realized that it would take a very long time before the annexed land would receive the projected buildings. So for the time being the City Fathers decided to divide the area into small parcels that could be rented as garden allotments. Many trees were planted, and they gave the district a woody appearance; hence the name *Plantage*, plantation. Unfortunately, this development caused the arrival of a great number of little inns of a doubtful kind, and for a while the Plantage did not have a good reputation. During the 19th century the garden plots were eventually sold to developers and within the short span of 50 years buildings rose in their place, amongst them many buildings of the University.

Two factors contributed to the establishment of a Botanical Garden in Amsterdam. First, the "Cruidtboek" produced by the University of Leiden professor Dodonaeus in 1554 which described all plants then known, stimulated interest in plants. The 1608 edition turned out to be especially popular.

In addition it was realized that in a time where medical practice depended so much on the plant world, the botanical knowledge of doctors, druggists and their helpers was insufficient, to say the least. Consequently some of them petitioned the city of Amsterdam in 1618 for a Botanical Garden, where living plants could be studied.

First they acquired a site at the Amstel River, but after moving twice, the garden was established at its present site in the Plantage. The year was 1682, and the Athenaeum was 50 years old. It was called the Hortus Medicus (medical garden) and it was run as an independent institution.

The Hortus developed into a pleasant park, where more than 2,000 plant species were cultivated, many of them exotic. It attracted the attention of scientists from all over the world, amongst them

Linnaeus. He had come to Holland in 1735 to claim his doctorate in the University of Harderwijk, long since extinct. His dissertation on the principles of classification was only 14 pages long but it nevertheless opened many doors to him. Linnaeus often visited the Hortus, while he was writing one book after another for the then Burgomaster of Amsterdam, George Clifford, who had a large collection of plants on his estate that he wished to have described.

At one stage, when Napoleon's brother, Louis, who was then King of Holland, resided in Amsterdam, the Hortus was partially transformed into a zoo. Louis wanted the Hortus to be a Royal Garden and donated a menagerie in 1809. However, when the Kingdom collapsed one year later, the animals were sold at auction.

Until the end of the 18th century the Amsterdam Hortus was one of the largest and most famous botanical gardens in the world. Although this is no longer the case, it still fulfils more than adequately the purpose of a botanical garden: research, education and preservation. The arrival of Hugo de Vries, as we shall see, was a great stimulation for further development.

In addition the Hortus played an important role in economic botany. Two examples will be enough to illustrate this. Two potted plants of the Oil Palm in the Hortus were sent to Java and became the origin of the rich and thriving Oil Palm culture in Indonesia; and one specimen of a self-fertile coffee plant, obtained from Java, became the origin of the coffee culture in Brazil and the West Indies. It is an astonishing fact that a whole culture was derived from one pot-plant in the Hortus.

Only in 1877, when the University of Amsterdam was established, did the Hortus cease to be an independent institution and become part of the University.

The University of Amsterdam had a modest start in 1632 in the form of an Athenaeum, housed in the reconstructed chapel of a cloister which had been destroyed by fire in 1452. In this "Athenaeum Illustre" one floor was made available with two lecture rooms. Below was the Admiralty, and above, very conveniently, the City Library. However, not much use was made of the premises, because most of the handful of professors preferred to lecture in their laboratories, in the hospital or at home - a practice that was followed well into the 19th century.

Although there were initially only a few professors, most of them were quite famous. However, those students who wanted to work for a doctor's degree had to go to the Universities of Utrecht or Leiden, because the Athenaeum was not empowered to confer that degree.

This situation changed in 1876, when a law was enacted by which the Athenaeum became a full-fledged university, the University of Amsterdam. It would remain a municipal University until recent times and, as such, it had no subsidies from the Government. After 1876 the development of this University was rapid and extensive.

In 1877 three professors were appointed who would make the University of Amsterdam world-famous. They were the physicist van der Waals, the chemist van 't Hoff and the botanist Hugo de Vries. Their laboratories were in the Plantage.

Hugo de Vries was not only famous as one of the founders of plant physiology, but he was even better known as the founder of modern genetics. His study of variability and monstrosities as hereditary deviations led to the publication of the mutation theory in 1901, which was accepted all over the world. It is a remarkable testimony to his genius that this theory was developed from the study of species of Evening Primroses, which show anatomical peculiarities that make them less suitable for study of mutations. De Vries could not know this, and it certainly did not detract from the importance of his findings.

De Vries also rediscovered, at the same time that two other great botanists did so independently, the laws of Mendel. But when he received Mendel's publication of 1866, which had been hidden in an obscure periodical, from Prof. Beyerinck of Delft (the "father of microbiology"), he gave Mendel full credit.

Hugo de Vries did not receive the Nobel Prize, but he was the recipient of innumerable honours. His experiments with Evening Primroses were done in experimental plots in the Hortus, which contributed greatly to its fame as a Botanical Garden.

Not far from the "Hortus" is a physics laboratory, built in 1880, where fundamental work would revolutionize our conception of matter and lay the basis for the modern explosion of technical developments. Van der Waals developed the famous equation that explained all phenomena in gases. Equally important was the discovery by Zeeman of the splitting of spectral lines under the influence of a strong magnetic field. Lorenz had developed the electron theory, and the Zeeman effect made it possible to calculate the mass and charge of an electron. In 1902 Zeeman and Lorenz received the Nobel Prize. When Zeeman became Professor Emeritus in 1921, he was visited by Einstein; truly a gathering of great physicists.

Meanwhile, the University of Amsterdam had become famous in yet another field. The experiments conducted by Hugo de Vries on osmosis in plant cells laid the foundation for the work of the chemist van 't Hoff, whose work on the osmotic pressure of dilute

solutions earned him the Nobel Prize. In accepting the prize, van 't Hoff gave full credit to de Vries.

It is interesting to note that all these intellectual giants appeared in about the same period, i.e. the turn of the century. The Netherlands have not seen a comparable flowering of genius since then.

Apart from a Botanical Garden, the Plantage also harbours a first-rate Zoological Garden. It was opened in 1839 under the motto: Artis Natura Magistra, and has been called Artis ever since.

Finally, it should be said that the Plantage was not only interesting for its connection with science, but it was also the place where the Socialists met, and where one could see a good play in one of several theatres. These have now disappeared, while one of them, during the last war, acted as the place where Jews were brought together before they were sent off to Germany. It is now a memorial, with only the gable intact.