

# The Golden Age of Dutch Colonial Botany and its Impact on Garden and Herbarium Collections

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## Abstract

Apothecaries and surgeons aboard the first fleet of the Dutch East India Company (VOC) in 1602 were instructed to collect herbarium specimens and make detailed observations and illustrations of useful and interesting plants during their voyage. Yet it would take three decades before a first botanical account of some plants from Java would materialise, and much longer before the three great Dutch pioneers of Asian tropical botany and servants of VOC, Paul Hermann (Ceylon), Hendrik Adriaan van Rheedee tot Drakenstein (Malabar Coast, India), and Georg Everhard Rumphius (Ambon, Indonesia) made their momentous contributions. Hermann's herbarium collections are currently mainly in London, but with significant subsets in Leiden and Gotha they were the basis of Linnaeus's *Flora Zeylanica*. *Hortus Malabaricus*, authored by the nobleman-soldier-diplomat cum amateur botanist Rheedee remains a relevant source of ethno-botanical and pharmacognostic information, judged by its recent annotated translations into English and Malayalam by K.S. Manilal. In his powerful role in the VOC, Rheedee moreover instructed VOC officials in India, Ceylon and the Cape Colony to send seeds and living plants to Dutch botanical gardens. *Herbarium Amboinense* by Georg Everard Rumphius, another self-taught botanist, was recently translated into English and richly annotated by E.M. Beekman and is even of greater significance. It is an inspiration for modern biopharmaceutical studies of tropical plants, selected on the basis of historical ethno-botany. These three highlights of Dutch colonial botany would form a basis on which 20<sup>th</sup> century initiatives such as *Flora Malesiana* and *Plant Resources of South East Asia (PROSEA)* still could build.

**Key Words:** Hermann, Botanical Gardens, *Herbarium Amboinense*, *Hortus Malabaricus*, Rheedee, Rumphius

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One can argue that the Golden Age of colonial botany in the Netherlands roughly lasted from about 1600 when significant natural curiosities were brought back from the East, until the mid 18<sup>th</sup> century, after which both the East and West India Companies de-

clined in significance. Doubtlessly the flourishing of tropical botany was only possible thanks to a strong 16<sup>th</sup> century tradition in the Low Countries, fostered by great Flemish herbalists Dodonaeus (1517–1585) and Mathias de l'Obel (Lobelius; 1538–1616), and the

more universal scientist Carolus Clusius (1526–1609). Clusius equally appreciated the medicinal and ornamental value of plants, and showed an active interest in tropical plants ever since he had translated and revised Garcia da Orta's book on Indian spices and 'simplicia' in 1567 (Egmond 2015). In his old age as honorary professor of the young Leiden University Clusius had persuaded the authorities of the Dutch East India Company (Vereenigde Oost-Indische Compagnie, VOC) to instruct apothecaries and surgeons aboard ships of their first fleet to the East Indies "that they bring along branchlets with their leaves, laid between paper ... Especially of the searched after spices: pepper, nutmeg, mace, cloves and cinnamon, but also of any other interesting plant. To make illustrations. And to record local names and uses, and how they grow" (Baas 2002). The whole instruction to the medical staff of the VOC almost reads like a 'Systematic Agenda 1600', but it would take decades before significant collections were accumulated and research yielded any results. Jacobus Bonnius, physician of Jan Pieterszoon Coen, the cruel first VOC Governor on Java, was the first to write an account of 70 Javanese plants, published much later by Willem Piso (see De Wit 1949, who also recorded the role of several other 'minor' pre-Linnaean botanists in the Malaysian region).

Truly monumental botanical contributions, justifying the label 'Golden Age' had to wait until the second half of the 17<sup>th</sup> century when Paul Hermann (1646–1695), Hendrik Adriaan van Rheede<sup>1</sup> tot Drakenstein (1636–1691) and Georg Everhard Rumpf (Rumphius, 1627–1702) combined their service for the VOC with botanical studies in Ceylon (Sri Lanka), Malabar (modern Kerala) and the Moluccas (Indonesia). In this paper I will briefly summarise their contributions, drawing from an earlier review paper in

Dutch (Baas 2002) of the role of the VOC in 'Flora's pleasure gardens', and a paper on Rumphius (Baas & Veldkamp 2013). These publications were in turn largely based on thorough bio-historical studies by Karsten (1967) on Hermann, by Heniger (1986) and Manilal (2003) on Rheede, and by Buyze (2006), and Beekman (1999, 2011) on Rumphius.

These three botanical heroes, though often physically very remote from any colleague or centre of learning did not work in a vacuum. They knew that many people in the home country were very eager to increase their collections of natural curiosities and knowledge of the exotic plant world in the East, for enabling them to read God's *Book of Nature* (Jorinck 2006) and/or to obtain empirical knowledge on useful exotic plants. They could also fall back on a growing body of academic expertise represented by professors of medicine (incorporating botany) and botanical garden curators at Dutch universities and wealthy and knowledgeable amateurs associated with the VOC. In this paper I limit myself to the three 'tips of the iceberg' in the exploration of the East Indies. The early botanical explorations of the Cape Province in South Africa (Hermann and many others) and Japan (Kaempfer), as well as the early exploration of Brazil by Markgraf and Piso during the campaign of the West India Company lead by Johann Maurits of Nassau-Siegen in Pernambuco, Brasil, that would result in the landmark publication *Historia Naturalis Brasiliae* in 1648, are also very important highlights of the early Dutch colonial history, but will not be discussed here.

I use the term 'Dutch Colonial Botany' with some hesitation. Colonial implies the conquest of and domination over territory. Initially the Dutch activities in the Far East were only aimed at trade. However, in its fights for trade monopolies the VOC often acted with equally cruel determination as the worst territorial colonial powers of the era (Beekman 1999), yet one could argue in favour of the adjective 'pre-colonial' for the Dutch Golden Age of tropical botany (Baas & Veldkamp 2013).

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1. Heniger (1986), in his authoritative biography has argued in favour of the spelling van Reede – without the h. But since hardly anybody followed that recommendation, and van Rheede tot Drakenstein is one of the ten spelling variants that were used during Rheede's life-time, I here conform to the spelling of his name "in current use".

Fig. 1. Herbarium specimen of the clove plant, *Syzygium aromaticum* (*Caryophyllus aromaticus*) from the Paul Hermann Herbarium in Leiden.



## Three Pioneer Botanists in the Service of the VOC

### *Paul Hermann – scientist par excellence*

Of the three main pioneers discussed here Paul Hermann was the only academically trained scientist. Born in 1646 in Halle, Saxony, he obtained a medical doctor's degree in Padua, and then entered the service of the VOC. The Company sent him to Colombo, Ceylon to explore whether the use of local medicinal plants were a good alternative for the classical European simples that were hitherto used by the surgeons and apothecaries of the VOC, and had proved ineffective and easily subject to decay in the tropical climate. On return to the Netherlands Hermann was appointed Professor of Medicine and Botany and Prefect of the *Hortus Botanicus* at Leiden University. Here he could use all his VOC contacts to accumulate living plants for the greenhouses built in the small garden under his governance. No one less than Linnaeus wrote a biography, or rather a hagiography of the great Hermann, in which no superlatives were left unused to sing his eternal fame earned by his floristic studies in the Cape and Ceylon (Karsten 1967; Baas 2002). The significance of Hermann's herbarium collections (Fig. 1) for nomenclature and typification has been well documented (Jarvis 2007), and its impact on tropical botany is testified by its use by Linnaeus (1747) for his *Flora Zeylanica*, his only excursion into tropical flora writing. Most of Hermann's erudite research on tropical plants was published posthumously by his student William Sherard, the first and famous Professor of Botany at Oxford University in the UK.

### *Hendrik Adriaan van Rheede tot Drakenstein – amateur botanist and team leader*

Rheede belonged to the rich and influential nobility of the province of Utrecht in the Netherlands (Fig. 2). Having received only private tuition and no formal education he entered the military and administrative service of the VOC on his twentieth (Heniger 1986).

Heroic action during the conquest of Cochin (Kerala, India) furthered his promotion to a high rank in the Malabar (-Kerala) operations of the VOC. Here he became overwhelmed with the botanical wealth of the region and impressed by the local knowledge of the Brahmins and Ajuurvedic practitioners. During a two year intermezzo in Ceylon he was confronted with the call by Andries Cleyer – apothecary of the VOC headquarters in Batavia (Jakarta) – for further research into tropical medicinal plants and their local uses. This call would lead to Paul Hermann's mission in Ceylon (see above). Back in Malabar, this time as Commander, Rheede befriended the Italian physician, missionary, discalced priest, and botanist Mattheus of St. Joseph, a keen student of medicinal and other plants of the Middle East and later India. So, when Reede embarked on his ambitious *Hortus Malabaricus* project in 1674, he could recruit a team of collaborators – Mattheus of St. Joseph, Brahmins, Ajuurvedic practitioners, interpreters, plant collectors (probably including soldiers under his command) and later in the Netherlands a changing series of professional (academic) botanists to create and edit a unique inventory of 689 plant species, mainly native, some introduced, beautifully illustrated and printed with pre-Linnaean names in Latin, Portuguese and Dutch and local names in Arabic, Malayalam and Konkani characters – a *novum* in botanical printing (Rheede 1678–1692; Manilal 2003). The accuracy of the plant descriptions was verified by Nicolson *et al.* (1988) and found to be in excellent order. This is remarkable when one considers the numerous linguistic pitfalls possible in a project that synthesised information from the local languages (mainly Malayalam) via the early colonial Portuguese language into Dutch and Latin. That linguistic achievement was recently extended by the critical translation into English and back into Malayalam by K.S. Manilal (2003, 2008). According to Manilal, Rheede and his team played a crucial role in preserving India's bio-cultural heritage: many of the original palm leaf manuscripts from which the medicinal uses were copied have meanwhile been lost.

Nicolson *et al.* (1988) only found one description and illustration impossible to interpret: a species







Fig. 3. Drawing from Hortus Malabaricus: 'Tsjem-tani', later named *Rumphia amboinensis* by Linnaeus (see text).

named 'Tsjem-tani', later renamed *Rumphia* by Linnaeus (1753: 1193), with the species name *Rumphia amboinensis* L., that does not seem to exist in nature (Fig. 3). Probably it is a species of *Croton* L. (Euphorbiaceae) with some grave mistakes in the Rheede's description and illustration. It is ironic that our third hero of the Golden Age of Dutch tropical botany Rumphius is thus remembered by a genus name of a plant that does not exist.<sup>2</sup>

#### *Georg Everard Rumphius – the blind seer*

Rumphius's biography has been the subject of many publications, most recently by Beekman (1999, 2011), Buyze (2006), Veldkamp (2011), and Baas and Veld-

kamp (2013), and will not be repeated here. Readers of Latin or Dutch had no problems in consulting his magnum opus *Herbarium Amboinense* as published posthumously by Johannes Burman between 1741 and 1755. However, the critically annotated translation into English by M. E. Beekman published in 2011 three years after Beekman's death, has rekindled the interest in this rich resource for bio-historical and ethno-botanical research. Buenz (2007) and Buenz *et al.* (2005) have already given a foretaste of how the analysis of Rumphius's texts helps to focus modern bio-prospecting studies with positive results about the medicinal value of *Atuna racemosa* Raf. (Chrysobalanaceae) and a convincing falsification of claims of great healing powers of the endocarp of giant coco-de-mer drift seeds (double coconut, *Lodoicea maldivica* (J.F. Gmelin) Persoon), that had already been put in doubt by Rumphius (Buenz & Bauer 2013). A sometimes neglected aspect of Rumphius's texts is that they contain so many witty and even funny observations, like the mind enhancing properties of the roots

2. When this manuscript was in press, D.J. Mabberley discovered that Van Rheede's illustration and description most probably were based on a species of *Canarium* L. (Burseraceae), and that the illustrator apparently had mistaken its pinnate leaves for simple ones (Mabberley 2016).

of *Bidens biternata* (Lour.) Merr. & Sherff (Asteraceae) applied by the school teacher of Rumphius's daughters, and the very tongue-in-cheek genus name *ABCDaria* for *Acmella paniculata* (Wall. ex DC.) R.K. Jansen in recognition that this plant was used by a local imam to improve the ability of his pupils to read and write Arabic. The many references to lust-enhancement by the consumption of fruits, seeds or other plant parts of for instance durian and cloves are also highly amusing to read (Beekman 2011; Baas & Veldkamp 2013).

### Impact on Systematics and Collections

Widjaja and Kartawinata (2013) have reviewed the long history of botanical enquiry in Indonesia. From the early botanical iconography sculpted on the walls of the 8<sup>th</sup> century Burobudur temple on Java up to the more recent *Flora Malesiana*, the PROSEA (Plant Resource of SE Asia) projects and current studies focused on Indonesian flora conservation. It is evident that contributions during the Golden Age of Dutch colonial botany, such as Rumphius's *Herbarium Amboinense* established a foundation and inspiration of many of the later and current developments. Similar analyses can doubtlessly also be made for the impact of *Hortus Malabaricus* and the Ceylonese herbarium collections of Hermann on later floristic inventory and ethno-botany of India and Sri Lanka, respectively.

Ironically, no or hardly any herbarium collections survive from Rheede or Rumphius's endeavours. A few specimens have been traced in Florence (Baas & Veldkamp 2013) and very recently a specimen of *Biophytum sensitivum* (L.) DC., (*Herba senticus* Rumph.) in the Hermann herbarium has been diagnosed as a plant probably sent to him by Rumphius from Ambon (Veldkamp, personal communication 2015). This does not mean that Rheede's and Rumphius's activities did not have an impact on the living collections in the Netherlands. Rheede's instruction from 1691 to VOC servants in the 'Western Quarters' of VOC's sphere of influence: Ceylon, India, and the Cape province in South Africa, was only strictly obeyed by Ceylon, but yielded many tropical accessions for es-

pecially the *Hortus Medicus* of the municipal university of Amsterdam. In addition most scientists, university garden curators, and ornamental plant enthusiasts with an interest in tropical flora were part of informal networks involving the governors of the VOC, ship captains, surgeons, and sailors sustaining a constant stream of natural curiosities, including seeds and plants from the Far East to the Dutch Republic (Baas 2002; Jorinck 2006). Even the great microscopist Antoni van Leeuwenhoek (1632–1723) acquired material from VOC ships of ebony from Mauritius, rootwood and seeds of nutmeg and bark of cinnamon from Ceylon, coconut seeds and stems from Java, and *Aloë* leaves from South Africa, for microscopic study and communication to the Royal Society in London (Baas 1982, 2001).

### International Impact

Already in the days of Clusius there was much international contact within Europe between plant collectors, herbalists and private and academic garden enthusiasts (Egmond 2015). Towards the end of the Dutch golden age of colonial botany, the international appeal of the Low Countries culminated in the three-year visit of Carolus Linnaeus from 1735 to 1738 (Blunt 1971). In the Leiden and Amsterdam botanical gardens and in Bennebroek on George Clifford's estate 'De Hartekamp' he saw many dried and living plant collections from the East and West Indies that must have acquainted him first-hand with many taxa to be included later in his *Species Plantarum* of 1753. The first edition of that starting point for Linnaean plant nomenclature only included few references to Rumphius's herbal, which was strange when we consider that he often stayed in Burman's house when the latter was involved in editing and translating it into Latin. However, already in 1754 his student Stickman validated a full list of binomials for plants from *Herbarium Amboinense* (Stickman 1754; Jarvis 2007; Baas & Veldkamp 2013). Rheede's *Hortus Malabaricus* also received international recognition from Linnaeus who based more than a hundred of his species on it (Jarvis 2007) and others like the influential botanist John

Ray in England acquired their understanding of tropical plants on it (Baas 2002).

With the decline of the Dutch East and West India Companies in the second half of the 18<sup>th</sup> century, we also see that the Dutch Golden Age of Tropical Botany came to an end. Clifford's and Hermann's herbaria were acquired by Joseph Banks to form important assets for the later Natural History Museum in London, and a Golden Age of colonial botany would dawn for the United Kingdom, assisted by Dutch (pre-)colonial collections. The Netherlands had to wait for a century or more before its tropical botany could play a significant role on the international stage again, this time with the Botanical Gardens of Buitenzorg (now the 'Kebun Raya' in Bogor, Java) and the Rijksherbarium in Leiden as dual engines, and the herbaria of Utrecht and Wageningen University catering for systematic and floristic studies in Suriname and the Dutch Caribbean islands, and tropical West Africa respectively (see Welzen & Schollaardt 2017).

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