

Prof.dr. Tinde van Andel

Open the treasure room and decolonize the museum



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Inaugural lecture delivered by

Prof.dr. Tinde van Andel

on the occasion of the acceptance of the position of

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Respected Rector Magnificus, members of the board of the Clusius Stichting, members of the Curatorium of this special chair, distinguished colleagues and listeners,

Botany, the science of studying plants, is probably the oldest scientific discipline. Early humans identified, collected and used plants that were edible, poisonous, medicinal, or suitable for construction or tools.¹ In order to exchange knowledge on useful plants to others, it is necessary to communicate about the characteristics of plants: the shape of their leaves, their fruits and flowers, their smell and taste and the place where they grow. As choosing the wrong plant for food or medicine can have deadly consequences, knowledge on how to identify plants has always been a strong evolutionary advantage.^{2,3}

The creation of gardens may also date back to prehistoric times. The gradual process of improving one's immediate environment by identifying useful plants and protecting them against wild animals, while eliminating undesirable species probably started with the Neanderthals, who spat out the seeds of wild-collected olives (*Olea europaea*) and dates (*Phoenix dactylifera*) before entering their Mediterranean caves⁴, thereby inadvertently creating pockets of useful plants around their dwelling places.

Some 11,000 years ago on the Mesopotamia plains, where large populations of wild goats and sheep grazed on nutritious wild grasses and legumes, some hunter-gatherers started to select the tastiest grains and the tamest grazers and settled in permanent dwellings to engage in agriculture.⁵ It was in present-day Syria and Iraq, where prehistory became history as people started to write and modern civilisation emerged. The oldest clay tablets, written in cuneiform script by Sumerians some 5,000 years ago, served as tax forms and trade agreements that documented the transfer of grain and sheep.⁵ A clay tablet produced around 2500 B.C., encountered south of Baghdad, explains that the best quality of opium can be produced when

the juice of poppy plants (*Papaver somniferum*) is collected early in the morning.⁶

In the following millennia, the history of Botany and Gardens largely overlaps with the history of Ethnobotany, the study of plant use by humans. This is illustrated by the many Egyptian murals and papyrus documents that depict fruit orchards, wine production, garden designs and grain production. The first writings that show curiosity about plants themselves, their different organs and their occurrence, appear about 350 B.C. in the work of Theophrastus in ancient Athens. Although the detailed plant descriptions and classification into herbs, shrubs and trees by this Greek 'father of Botany' are considered as the starting point for modern botany, his work still focuses on useful plants and agricultural practices.⁷ Four hundred years later, the Greek botanist Dioscorides, employed as a doctor in the Roman army, wrote his famous book *De Materia Medica*, describing more than 600 medicinal plants and their applications.⁸ The works of the Greek physicians and botanists Theophrastus, Dioscorides, and their Roman colleagues Pliny and Galen were translated in many languages, including Arab and Persian, copied, illustrated, edited, extended with new plants, new pathologies and treatments, and used for over 1500 years as the primary handbooks of herbal medicine.^{9,10}

The problem with these classical scientific works is that the originals no longer exist. Their plant descriptions were probably quite vague, and given the huge floristic diversity in the Mediterranean^{11,12}, the classic herbals must have often referred to herbs that were endemic to certain Greek islands.¹³ In the Middle Ages, it was simply assumed that these herbs also occurred in Western Europe. In later copies of the classical texts, the descriptions of Mediterranean species are interpreted as and accompanied by drawings of German, French and even American plants^{9,14}.

The Renaissance, which started around the 14th century in Italy, brought a scientific revival, in which the ancient Greek and

Roman texts were rediscovered and art and science focused on depicting and understanding the beauty of nature. A visionary Italian botanist, Luca Ghini (1490-1556), who gave classes for over 25 years in Pisa and Bologna, decided that it was essential to discover the real plants that had been the origin of the classical Greek and Roman texts on herbal medicine^{10,15}. Ghini is generally thought to be the first botanist to invent the herbarium, a collection of dried and pressed plants, glued on paper and bound in a book, so that they would keep the same shape as in nature itself and could be conserved forever without perishing.^{16,17} Dried plants mounted on paper are easier to compare, study and classify than iconographic documents.¹⁸ They can be exchanged and discussed with other scientist, while reducing the chance of confusion and misinterpretation.¹⁹

Ghini's goal was to register all plant species that existed in the world. He collected living plants from different Italian ecosystems, including the high Alps, and ordered exotic seeds from the Near East and even from the Americas, which had only recently been discovered. The Grand Duke of Tuscany, Cosimo I de Medici (1519-1574), allowed Ghini to plant these strange and exotic plants in his gardens in Pisa and Florence.¹⁵ The Duke paid Ghini's salary and gave him and his students unlimited access to his gardens, which gradually changed from noblemen's leisure places with ornamental flowers into the world's first Botanical Gardens, where plants from all over the world became the subject of education and scientific research.¹⁵ The exquisite richness of the northern Italian gardens and Ghini's Botany lectures attracted not only many students and scientists from Italy, but also from France, Spain, Portugal, Germany and England. Here they could not only study the true species described by Dioscorides, but also marvel at exotic plants from the New World, such as tobacco, sunflowers, hot peppers, maize, pumpkins and tomatoes.^{15,20,21}

Dedicated primarily to teaching, Ghini himself did not publish anything and his plant collections were probably included in his student's herbaria¹⁶, but he stimulated his students

to achieve significant careers. The famous Italian botanists Cesalpino, Maranta, Aldrovandi, Petrollini and Merini were all pupils of Ghini. They constructed extensive herbaria, wrote books on natural history and became collection managers of botanical gardens in Bologna, Pisa, Florence and Ferrara. Students John Falconer and William Turner introduced Ghini's innovative botanical methods to England. Ghini stimulated his colleague Mattioli to write a book about all plants mentioned by Dioscorides, but now with elaborate descriptions.¹⁵ One edition of Mattioli's Dioscorides comments²² contains beautiful illustrations, based on fresh plants and herbarium vouchers, made by another student of Ghini, Gerardo Cibo.²³ One anonymous student in Ghini's Botany class was so skilful in pressing the delicate flowers that he glued them on expensive paper, bound the sheets in a leather cover, ordered a clerk to write a neat index and engraved on the front page: "*En Tibi Perpetuis Ridentum Floribus Hortum*", translated as "Here for you a smiling garden of everlasting flowers"²⁴

This so-called En Tibi herbarium is much different in appearance than the student herbaria of the other Ghini pupils with their specimens damaged by frequent handling, cheap paper and up to seven pre-Linnaean names per voucher written in various handwritings, as can be seen in the Aldrovandi herbarium.²⁵ The paper of the En Tibi herbarium contains a watermark that we dated to around 1555 in Florence or Bologna, which makes it one of the oldest herbaria in the world. The herbarium was presented to a person who was very important for its unknown maker, maybe a dearly beloved one, but probably his sponsor. This beautiful historic herbarium is now housed in the treasure room of Naturalis Biodiversity Center in Leiden. Finally, after 461 years, this precious collection receives the attention it deserves, as its digitized specimens are identified and interpreted by the Greek botanist Anastasia Stefanaki. Supported by a multidisciplinary team of botanists, Italian librarians and art historians, paper specialists, handwriting experts and historians of science, Stefanaki tries to trace the mysterious maker of the En Tibi herbarium by

identifying its botanical contents and comparing these to contemporary Italian herbaria, literature and plant drawings.

The Italian dawn of botany soon spread throughout Western Europe, where numerous botanical gardens were created to house an increasing variety of plants, both indigenous species and plants acquired from other parts of the world. These gardens became the scene of detailed scientific observation, teaching and experimentation.²⁰ Botanists no longer waited in the harbours for ships bringing exotic specimens from the East and West, they now boarded the merchants ships themselves as ship doctors, apothecaries and explorers.²⁶

The German physician Leonhard Rauwolff, who studied Botany in Montpellier, boarded a ship in Marseille in 1573 and sailed to Syria, in search of new medicinal plants for his brother's apothecary. Rauwolf travelled through Aleppo, descended the Euphrates through Raqqa and Baghdad, came back via Kurdistan and continued to Lebanon and Palestine.²⁷ He vividly described the culture and customs of the Turks, Arabs, Christians and Jews in the vibrant multicultural society of 16th century Syria.²⁸ He collected specimens of henna, chickpea, pomegranate, almonds, wild narcissus and pistachio nuts and opens the saddlebags of the Persian caravans to see what types of medicinal roots they are trading. Rauwolf's travel account²⁹, published in 1582 became a bestseller and his drawings were used to describe type specimens³⁰, but his herbarium was locked in a treasure room for more than 400 years, where it was only seen by a handful of botanists, until a few months ago, when the Iranian ethnobotanist Abdolbasat Ghorbani identified its 200 specimens for the first time in 150 years after Edmond Boissier for his *Flora Orientalis*.³¹ Ghorbani discovered four new types in the Rauwolf herbarium³², and currently works on his publications on the botanical contents and ethnobotanical relevance of the Rauwolf herbarium.

In The Netherlands, the prefect of the Leiden Hortus Botanicus, Carolus Clusius requested the Dutch East India

Company (VOC) to 'collect branches with leaves, flowers and fruits of nutmeg, cinnamon, black pepper and other strange plants, pressed between paper, and to ask how the local people call these plants' during their journey in the far East.³³ Towards the end of the 17th century, ship doctors employed by the VOC and based at Ceylon and the Malabar Coast documented hundreds of medicinal plants, with detailed instructions on how to prepare the medicine from their roots and seeds, and local names in Singhalese and Tamil languages.^{34,35,36} The botanical heritage of the Dutch Golden Age are represented by herbarium collections, books and botanical drawings in the Special Collections of the Artis library, Leiden University library and Naturalis.

In 1637, count Maurits van Nassau invited botanist Georg Marcgrav and physician Willem Piso to the Dutch colony in Recife to describe the rich natural surrounding of northeast Brazil. This resulted in the first scientific book about Brazil, the *Historia Naturalis Brasilia*.³⁷ This biological and anthropological masterpiece with descriptions of hundreds of plants and animals and indigenous people, is kept at the rare book room of Naturalis.

In 1684, the Society of Suriname in Amsterdam wrote a letter to Cornelis van Aerssen van Sommelsdijck, Governor of Suriname, asking whether he could send seeds of rare crops to serve as ornamental plants for the Hortus Botanicus in Amsterdam. The governor sent the mysterious botanist Hendrik Meyer to the forest to carry out this assignment. Meyer came back, not only with seeds, but also with 51 dried plant specimens, accompanied with detailed descriptions on how to use them, provided to him by local Indians and African slaves. This first botanical collection of Suriname, dating from ca. 1687, is also present in the Naturalis treasure room.³⁸

With the expansion of trade and exploration beyond Europe, many new plants were discovered and subjected to an increasingly rigorous process of naming, description, and

cataloguing according to new scientific principles. Dried plants were now mounted on separate sheets to facilitate their classification into different taxonomic groups. The greenhouse was invented, which made it possible to grow exotic plants in the Dutch Botanic Gardens.³⁹ It was in 1735, when the young Swedish botanist Carl Linnaeus started to work in the greenhouse of VOC director George Clifford in Heemstede. The wealth of exotic plants from Ceylon stimulated Linnaeus to describe and catalogue Clifford's collections, some of which ended up in the Wageningen herbarium⁴⁰, now also part of Naturalis.⁴¹ The Heemstede greenhouse contributed substantially to the beginnings of modern plant taxonomy, which led in 1753 to the publication of *Species Plantarum*⁴², the starting point of modern botanical nomenclature that remains in use to this day.⁴³

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The En Tibi and the Rauwolf herbaria came in the hands of the Holy Roman Emperor Rudolph II (1552-1612), who stored his extensive natural history collections in his 'kunstkammer' in Prague. This treasure room was robbed in 1620 by the Bavarian troops of King Maximilian I (1573-1651), who deposited the collections in his own kunstkammer in Munich, which was in turn looted by the soldiers of the Swedish king Gustaf II Adolf (1594-1632), who gave the treasures to his daughter Christina, who was interested in science. About 1650, Queen Christina presented the herbaria to her Dutch librarian Isaac Vossius, who brought the collections to London, where it was studied by a number of botanists, after which they were purchased by Leiden University (Dannenfeldt, 1968), where they ended up in the National Herbarium.^{44,45}

These valuable historical collections will form the basis of my research in the coming years in this Clusius chair of History of Botany and Gardens. Historic herbaria are large books with fragile dried branches and leaves, which easily break off when the pages are opened too often. The 17th century botanical drawings and historic books are also quite vulnerable and should be touched with white gloves only. These collections are

not only of outstanding beauty, they also represent a unique moment in time and space, so they can never be replaced or reproduced.⁴⁶ Because of their unique value, they have been locked away in treasure rooms that few people were allowed to enter. They were not properly indexed or described in catalogues. This went on for centuries, until some University staff must have forgotten that they existed. Linnaeus, who during his time in Leiden would have been very interested in describing these exotic collections, has apparently overlooked many of them.^{38,49} Even in 2014, when the large FES project enabled Naturalis to digitize its entire herbarium⁴⁸, the historic collections were not included. Did the Naturalis management know they existed?

The botanists themselves, however, can partly be held responsible for this oblivion of the work of their pioneering forefathers. With notable exceptions, like Simon Van Ooststroom, who made an inventory of the Hermann herbaria^{49,50}, Gerard Thijsses's work on the historic Japanese collections and the Van Royen herbarium^{51,52}, Hans Heniger on Gaymans⁵³ and Renske Ek on Clifford⁴¹ and Maarten Christenhusz on Cade⁵⁴, much of the historic collection have not yet been studied in detail.

The reason for this is that historic herbaria mostly represent the results of inventories: a large variety of plant families and species, collected by an explorer in a new country.⁴⁶ The majority of the plants are not collected according to modern botanical standards, so flowers, fruits, labels, and exact locations are often lacking. Herbaria that were never revised by Linnaeus or later botanists still contain pre-Linnaean names, inconsistent sentences of 17th century Latin in many different spellings that cannot easily be looked-up in online databases such as the Plant List.⁵⁵

Most botanists are taxonomists, focused on the morphological traits and evolution of one specific plant family or genus. Therefore, they are not always able or willing to study plant

species that do not belong to their favourite group. When these historic book herbaria were occasionally opened by a taxonomist, this was often only to study one specific page with a species of their interest, to designate a Type specimen^{30,56} or extract a leaf fragment for DNA analysis⁵⁷ after which the book was closed again. Finally, not many taxonomists are interested in local names and uses of plants, or to read the travel diaries of these explorers or historic botanical garden inventories to put the collections into context. Moreover, the associated literature is written in Latin, Spanish, Portuguese, French, Arabic, Romanized Greek, German, old-fashioned Dutch or Italian, and often not digitized in a way that Google Translate can handle it.

Botanists are also not too eager to study historic plant drawings, as these often are drawn 'too fashionable', lack the precise size proportions and details of the plant organs essential for identification. They prefer to study herbarium vouchers, as these represent the 'real material', which they can zoom in under a microscope and from which they can dissect flowers and fruits and extract DNA. Historians have so far also neglected these collections, since they consider dry plants or botanical drawings without too much textual context to be 'difficult material'. Art historians, on the other hand, are interested in old plant illustrations, but they mostly focus on the paper, the ink, the drawing style and the binding, while often neglecting the depicted plant specimen.⁵⁸

Here is where History and Botany can meet, and should meet, to reveal the hidden treasures in the treasure rooms, to trace the footsteps of the botanizing explorers, and to explain the scientific and societal relevance of these historic collections today. In the coming five years, my aim is to study several historic herbaria and plant illustrations in the treasure rooms of Naturalis and the Leiden University Library. My general research questions are as follows:

- Which plants do they contain (or depict)?
- Why those specific plants?

- Who was the collector / artist and what were his motives?
- How do these historic collections fit in the History of Botany and Gardens?
- What is the scientific importance of these historic collections today?
- How can we share this with the people in the country of origin of these plants?

The first step is to digitize the historic collections by making high-resolution photographs. In the past years, the photo studio of the Teylers Museum in Haarlem has been essential in producing images of several historic book herbaria. The Centre for Digital Scholarship of the Leiden University Library is creating a web environment that facilitates the study of botanical drawings within their Special Collection.⁵⁹ By publishing these images and their associated information on the web, we open the treasure room for the entire world, without the need to hand over the key and risk the damaging of our collections.

The second step is to identify the specimens. When the quality of the samples or drawings is good enough, and the country of origin is known, this work can also be done by students. The Leiden University / Naturalis course Plant Families of the Tropics provides the botanical background to do these identifications. Student internships on historic collections provide adequate training in the use of floras and herbarium collections. When the collector (or artist in the case of drawings) is unknown, the plants themselves often provide the clue for finding its maker and his motives. The numerous leaves of cinnamon in both drawings and collections from Ceylon clearly illustrate the main interest of the VOC, the employer of the ship doctors who were documenting traditional knowledge. The carefully dugout tubers of desert plants collected by Rauwolf in Syria demonstrate that his sponsor was an apothecary that traded medicinal plants, mostly in the forms of roots.²⁸

Apart from the fact that these historic collections hidden type specimens³¹, rare or extinct plants, the pre-Linnaean names, the references to ancient Greek and Roman literature and the many mistakes made by the collectors, illustrate the evolution of botany as a science, the training of these scientists and their professional networks, which is of great interest to Historians of Science and Ethnobotany.⁶⁰ The descriptions of the plant uses, the recipes to treat diseases and the local names offer unique opportunities for ethnobotanists to study the continuity in plant names and uses over time, as well as the changing ideas about health and illness.^{38,61}

The treasure rooms contain more than historic herbaria and drawings. The Economic Botany collection of Naturalis harbours eight thousands useful plants products from overseas territories: endless glass jars and boxes with coffee and cocoa beans, tea, tobacco, rice, sorghum, sugar cane, quinine bark, fibres, resins and medicinal roots. These rich colonial collections, once proudly shown during world exhibitions, can be seen as the material library of the Dutch colonial era. They have been stored for centuries in museums and universities before they were deemed superfluous and handed over to Naturalis, where they are waiting to be studied, exposed and admired.

Many of these ancient crop cultivars do not exist anymore. In modern agriculture, plant breeders have selected a limited number of crop species for their fast growth, high yields and uniform appearance. As a result, the modern commercial crop cultivars have a narrow genetic diversity, vulnerable for climate change and depletion of soil nutrients, which is generally considered as a potential threat to food security.⁶² Recently, plant breeders and agronomists have called for global conservation priorities for historic crop cultivars and crop wild relatives, as these 'forgotten vegetables' and 'wild cousins' of domesticated crops possess the genetic diversity that is essential for developing more productive, nutritious and resilient crop varieties.⁶³ The seeds of these historic crops

cannot be revitalised anymore, but their DNA still contains information on their properties. Now that scientists have unravelled the complete genome of important crops⁶⁵, we can compare the DNA of our old crop collections to see how they differ from modern cultivars. They probably contain more genes associated with natural protection against pests and diseases or with slower growth but a better taste.⁶⁶

We should always keep in mind that most of this plant material was collected outside The Netherlands. The information on how to prepare these plants, the illnesses they could cure, the baskets that could be woven with its fibres, came from local people. These collections do not only characterize the Dutch colonial quest for new materials, they also represent other people's cultural heritage. These collections are not visible to the general public. We have certainly never shared them with the descendants of those people who worked on the Dutch plantations or who helped the botanists collect these plants, and shared their knowledge on recipes and names.

A few months ago, I showed the Syrian Rauwolf herbarium to Joelle Breidy, National Seed Bank Manager from Lebanon's Ministry of Agriculture. Examining the traditional cultivars of sorghum, pistachio and eggplant, collected 450 years ago in an area that is considered the cradle of human agriculture⁵, she immediately recognized the potential value of this herbarium. Looking at Joelle's excitement, I realized that she was the first person from the Middle East that had ever seen this herbarium.

My goal is not only to use these collections for scientific research and teaching, but also to share them with the general public, especially with people from the countries of origin. Therefore I would like to take this opportunity to make a call to "Open the treasure room and decolonize the museum". Open the treasure room to look what is hidden there, digitize it and make it available for research. Decolonize the museum, not by giving back the collections themselves, but making them digitally

available, with their scientific and cultural context. By trying to attract scientists and students from the regions where our collections come from, as they are better aware of their cultural contexts. By inventing new ways to communicate the results with the societies in Sri Lanka, Suriname, Curacao, Japan, Syria, Indonesia and the other countries where our collections come from. By showing these collections to the migrant community in The Netherlands and ask them what they remember about these products from their motherland. This is not only a method to get a more diverse museum public, but these people could have additional information to share and fill gaps in information that is lacking from the current labels.

In the first year of this Clusius chair of History of Botany and Gardens, I made a head start by attracting Abdolbaset Ghorbani, the Iranian ethnobotanist of Turkmen descent to study the Syrian Rauwolff herbarium. He could not only interpret the Turkish and Arab plant names and uses, but also recognized many of the herbs from the kitchen gardens of his homeland. This year, we will publish all the specimen images with their identifications and translations on the Internet. In a time during which the cultural heritage of Syria is destroyed every day, Baset and I are also making plans to involve the community of Syrian refugees in Europe in our research on the Rauwolf herbarium.

The herbaria that Rauwolf collected in southern France are currently studied by Alice Bertin, a young botanist from Marseille. For the illustrations of medicinal plants from Ceylon, we work with art historian Mieke Beumer of the Artis library and Anjana Singh of Groningen University, who is from Indian origin, to find out when these drawings were made and by whom. Last year, a Japanese student in Organic Agriculture, Shantonu Abe Chatterjee, identified hundreds of hand-coloured illustrations of Japanese traditional vegetables in the Sekei Zusetsu agricultural encyclopaedia of the Von Siebold collection at the Leiden University library.⁶⁷ He was the only student in Wageningen who could do this type of

research. When he gave his presentation on forgotten Japanese vegetables at the Leiden Hortus, the room was packed and the public loved it. There is a great public interest in the Dutch colonial history. The botanical side of this history has a great potential to reach a wide audience. Useful plants appeal to many people because they are close to everyday life. All the Japanese forgotten vegetable drawings will soon be published with names and background information on the website of the Leiden University Library.

Although it was an Italian who made the En Tibi herbarium, it took a Greek botanist to discover his attempts to reconstruct the ancient herbal of the Greek Dioscorides. This year, we hope to attract two Italian scientists, historian Floriana Giollombardi and botanist Rosana Costa to study our Boccone herbarium, a 17th century collection that served as a basis for the famous *Icones et descriptiones rariorum plantarum*⁶⁸ written by the Italian explorer Paolo Boccone. With Mark Nesbitt of the Royal Botanic Gardens Kew and Historian of Science Toine Pieters (Utrecht University), we are planning a Horizon2020 proposal to stimulate European collaboration among institutes who harbour Economic Botany collections. Within the current Time Capsule project, also led by Pieters, historic plant collections are linked with pharmacological literature and digitized archives of the VOC and WIC to trace how and when the exotic plant medicine from the East and West entered the Dutch pharmacopeia.⁶⁹

With Mei Wang, specialist in Chinese Traditional Medicine at Leiden University, I hope to attract a Chinese PhD student to study the Materia Medica collections from China at Naturalis and Utrecht University. We will compare the historic trade in traditional medicine between China and The Netherlands with the Chinese herbs that are currently sold in The Netherlands and try to detect a shift in species. We also plan to perform chemical analysis on some of the historical collections to see whether the century-old specimens still contain pharmacological activity.

With the Brazilian anthropologist Mariana de Campos Franoso, affiliated with the Leiden archaeologists, I hope to attract funding for a multidisciplinary study on the *Historia Naturalis Brasiliae*, the book on Brazilian plants, animals, people and material culture that was ordered by Johan Maurits van Nassau in 1648. Our aim is to find out how local indigenous knowledge influenced the making of science in 17th century Brazil. We hope to go back to Brazil and trace what the current descendants of Tupi Indians, the people who shared their knowledge of the natural world with Marcgrav and Piso, still know about their natural surroundings. The Museu Paraense Emílio Goeldi, located in Belem along the Amazon River, will open their treasure room of beautiful Amerindian artefacts to the Tupi Indians, so they can reconnect with their own cultural heritage. The Tupi have lost much of their traditional knowledge, but part of it can be revitalized by this reintroduction to the skills of their great-grandparents.⁷⁰

Historic useful plant collections, whether preserved as drawings, dried branches, baskets or pieces of bark in a glass jar, are not only interesting objects for studying changes in plant knowledge and use over time. They also connect us to our ancestors, whether they were the exploring botanists, the traders of the VOC and WIC, the consumers of exotic products or the local people in tropical countries, whose hard, but not always voluntary work formed the basis of the Dutch prosperity for centuries. I am confident that this Clusius Chair will help us to uncover our own history, now hidden in old plant collections.

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Tinde van Andel was trained as a tropical ecologist at the University of Amsterdam. During her master thesis on the vegetation structure of swamp forests in the Colombian Amazon, she realised that the local Muinane Indians knew the forest much better than anybody else. She became interested in Ethnobotany and studied the use of Non-Timber Forest Products by Carib, Arawak and Warao Indians in northwest Guyana for her PhD at the Utrecht herbarium. During a trip to nearby Suriname, she visited the medicinal plant market in Paramaribo. Here she discovered that the plant use by people of African descent was radically different than that of their Amerindian neighbours. Since then, she has focused on continuity and changes in plant use after migration. Apart from her scientific output, she published a popular book on medicinal and ritual plants of Suriname. A NWO Vidi grant made it possible to search for the botanical and cultural origin of Caribbean plant use in West and Central Africa, with a focus on ritual plants and medicinal plants for women's health and child care. She supervises researchers on PhD and postdoc level, as well as several MSc students. At Wageningen University, she currently teaches Ethnobotany and is involved in research on the provenance of African rice in the New World. At Leiden, she studies historic plant collections and illustrations in the special collections of Leiden University and Naturalis Biodiversity Center.



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