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The book herbaria of Jacob Breyne (1637–1697) in the collection of Naturalis Biodiversity Center (Leiden, the Netherlands)

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Key words

Gdańsk
historic herbaria
history of botany
Poland
Pomerania

Abstract Historic herbaria can provide a wealth of information on a diversity of topics, including the past occurrence of plants, their abundance, names and uses. However, 16th and 17th century herbaria are rare and very fragile, and can best be studied after digitization. The collection of Naturalis Biodiversity Center in Leiden, the Netherlands, contains two book herbaria by Jacob Breyne (1637–1697) of Danzig (presently Gdańsk, Poland). These herbaria, dated 1659 and 1673, contain a total of 105 specimens in various states of intactness, and with or without original labels. The identity of the specimens in the Leiden Breyne herbaria was not completely assessed previously. Here we discuss the taxa represented within these two historic herbaria as well as the information contained in the handwritten texts within them. The two Breyne herbaria combined were found to contain 62 species, representing 24 plant families. Both herbaria contain several species now rare around Gdańsk, including two species currently considered regionally extinct (*Swertia perennis* (*Gentianaceae*) and *Dactylorhiza viridis* (*Orchidaceae*)). Labels with the specimens give a range of information on the collecting locations, ecology, abundance and/or use of the species. The Leiden Breyne herbaria reveal changes in the flora of northern Poland over the course of three centuries, as well as pre-Linnaean nomenclature, historic uses of plants and international correspondence between scientists.

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INTRODUCTION

Historic herbaria are an important source of knowledge about the history of botany, and science in general. They can provide examples of pre-Linnaean nomenclature and systematics (Spalik 2014, Pulvirenti et al. 2015, Costa et al. 2018, 2020), give indications on the uses of plants in the past (Van Andel & Barth 2018) and provide evidence for the historical occurrence of species in a certain area (Santos-Guerra et al. 2011, Pulvirenti et al. 2017, Stefanaki et al. 2018). Furthermore, these collections of dried plants can provide indications about international relations and communication among scientists at the time of their production (Thijsse 2016, Offerhaus et al. 2020). They are a part of the cultural heritage of the places where the plants were collected, and as such should be made accessible to the people of these regions (Van Andel 2017). However, since they are rare and very fragile, they can best be studied using digital images.

The collection of Naturalis Biodiversity Center (NBC, Leiden, The Netherlands) contains two book herbaria made by Jacob Breyne (1637–1697). Breyne was born and raised in Danzig, Prussia (now Gdańsk, Poland), where his father ran a business trading raw materials for paint and medicine production, mainly Polish cochineal: a dye derived from a scale insect feeding on the roots of *Scleranthus perennis* L.(*Caryophyllaceae*) (Van Ooststroom 1942, Pękacka-Falkowska 2018, Fleischer 2019, 2020). From an early age he was interested in natural history, received lessons in botany, and took regular trips in the Danzig countryside (Fleischer 2019). Moreover, the Breyne family owned a house and garden along the river Motława, including a collection of exotic plants.

In 1653, Breyne visited the Dutch Republic, to be trained as a merchant by his uncle Pieter Breyne. While there, he visited several gardens, among which were the botanical gardens of Leiden and Amsterdam, and Lockhorst, the house and garden of Hiëronymus van Beverningk, a politician and patron of botanists such as Paul Hermann (Van Andel & Barth 2018), and he studied botany at Leiden University (Fleischer 2019). Jacob wanted to continue his studies at the Leiden medical faculty, but was called home to take on the family business after his father's death. Years later, he was offered the position of professor of Botany at Leiden University, but Breyne declined, and the position was later filled by Paul Hermann (Van Ooststroom 1942, Fleischer 2020).

Back in Danzig, Breyne continued botanizing locally, as well as corresponding with other botanists worldwide. He used his Dutch connections to contact people working for the Dutch East India Company (Vereenigde Oostindische Compagnie, VOC), and thus gain access to plants, seeds, bulbs and dried specimens from Asia and the Cape of Good Hope (Gunn & Codd 1981, Pękacka-Falkowska 2018, Fleischer 2019, 2020).

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Breyne published two major works on (mainly exotic) plants: *Exoticarum aliarumque minus cognitarum plantarum centuria prima* (Breyne 1674–1678; known for short as the *Centuria*) and *Prodromus fasciculi rariorum plantarum* I & II (Breyne 1680–1689; *Prodromus*), which he printed himself. He planned on publishing works on local plants, entitled *Pomerelliae Viridarius* and *Viridario Borussiaco* (Pękacka-Falkowska 2018, 2021), but never finished them. His manuscripts on Prussian plants were later used by Gottfried Reyger, who wrote his *Tentamen Florae Gedanensis Methodo Sexuali Accomodatae* (Reyger 1764) on the flora of the area around Danzig (Pękacka-Falkowska 2018).

Jacob Breyne is remembered in botany today for several things: he was one of the first Europeans to describe the tea plant (*Camellia sinensis* (L.) Kuntze, *Theaceae*), based on a description (and possibly dried plant parts) sent to him by Willem ten Rhyne (1649–1700) from Dejima, Japan (Gunn & Codd 1981, Fleisher 2020). He also coined the name *Mesembrianthemum* for a genus of plants in the *Aizoaceae*, originating from the South African Cape region. According to Gray (1880), Linnaeus adopted this name in his *Species Plantarum* (Linnaeus 1753), but misspelt it as *Mesembryanthemum*, which has become the official spelling. Finally, the genus *Breynia* J.Forst. & G.Forst. in the *Phyllanthaceae* was named after Breyne by Johann & George Forster (Forster 1776). Linnaeus also named a genus after Breyne (also called *Breynia* (Linnaeus 1753)), but this has been synonymized with *Morisonia* Plum. ex L. (*Capparaceae*).

The two Breyne herbaria at NBC contain a source of information which is, as of yet, largely unexploited. It can show developments in plant nomenclature, both on a longer and shorter time span. The labels written by Breyne contain one or several names by pre-Linnaean authors, such as Johann and Caspar Bauhin, Conrad Gessner and Mathias de l'Obel, as well as some local vernacular names. Then there are the labels added to the 1659 herbarium by De Monchy, of the Rijksherbarium in Leiden (now part of NBC), in the early 20th century, and the article on the 1659 herbarium by Van Ooststroom (1942). These contain binomials in the Linnaean system.

Furthermore, from Breyne's descriptions, we can trace the locations where he collected his specimens, and then see whether these species still occur there. The landscape around Gdańsk is bound to have changed over the three-and-a-half centuries since Breyne collected his plants, due to the expansion of the city and other changes in land use and climate. Hence, plants which may have been common in Breyne's days may now be very rare, or vice versa.

Breyne's notes in the herbaria could also give some indications of how the plants he collected were used in his day. Living in an era before artificially synthesized medicine, and a trader in the raw materials for dyes and medicines himself, Breyne is likely to have been interested in the practical uses of plants.

Finally, these herbaria are part of the cultural heritage of the area in which the plants were mostly collected (Pomerania province, northern Poland), but they have been stored away in the NBC 'Rare Book Room', not accessible to the public. This research will open up this piece of Polish heritage, by adding the plants' details and digital images of the herbarium to the online Naturalis Bioportal (bioportal.naturalis.nl), where they can be easily and freely accessed.

While exploring the Breyne herbaria and their importance to science today, we wanted to answer the following questions:

- Which species are included in the two Breyne herbaria? To which extent do these represent European / Polish (Prussian) or exotic plants?
- Did Breyne use a particular arrangement in his herbaria (by family/resemblance, by location, alphabetically)?
- Do the accompanying descriptions and labels give indications of the plant uses, collecting locations and abundance, and do these species still occur around the same locations?
- To which extent are the represented species discussed in Breyne's *Centuria* and Gottfried Reyger's *Tentamen*?

METHODS AND MATERIALS

Both Breyne herbaria in the NBC collection have been digitized, and high-resolution images were used for the identification of plant specimens. These images are freely available through the Naturalis Bioportal, and can be found by typing the associated barcode into the search field. When identification depended on details not visible on these images (e.g., hairs, small floral parts), then the herbarium specimens were physically examined under a stereo microscope. To analyse the names, locations and uses stated by Breyne, transcriptions of the labels by Pękacka-Falkowska (2018) and Van Ooststroom (1942) were used.

The identification of plants from the Breyne herbaria was conducted using floras covering eastern Europe (Tutin et al. 1964, Mirek et al. 2002, Jäger 2011, Seybold 2011), as well as the Netherlands (Duistermaat 2020). The names provided by the identifications of De Monchy and Van Ooststroom were checked against the aforementioned works, and in the International Plant Names Index (IPNI continuously updated) and Plants Of the World Online (POWO continuously updated). These sources were also used to find older synonyms of current names to aid searching for these taxa in other sources.

The current occurrence of taxa was checked using a checklist for the Polish flora (Mirek et al. 2002). The current conservation status was assessed using the red list for Gdańsk and the surrounding area (Markowski & Buliński 2004).

Digital versions of Breyne's *Centuria* (Breyne 1674–1678) and *Prodromus* (Breyne 1680–1689) and Reyger's *Tentamen* (Reyger 1764) were used. The presence of plants in these works was checked by searching for the pre-Linnaean names used by Breyne, and comparing descriptions with these names to the specimens in the herbaria.

The paper sheets used to construct the herbaria were checked for watermarks, in order to reconstruct the origins of the paper via the online Memory of Paper database (www.memoryofpaper.eu).

RESULTS AND DISCUSSION

The Leiden Breyne herbaria

The Breyne herbaria in the Leiden collection are dated 1659 and 1673. They come from the collection of Hiëronymus van Beverningk (1614–1690). Breyne is known to have visited Lockhorst, Van Beverningk's estate near Leiden, and to have seen his collection of tropical plants (Van Ooststroom 1942, Pękacka-Falkowska 2018). Van Beverningk bequeathed his collection of herbaria to his nephew, and through successive inheritors, the herbaria eventually ended up at the Leiden University library. From there, they were transferred to the National Herbarium of the Netherlands, which is now part of NBC (Van Steenis-Kruseman 1979, Pękacka-Falkowska 2018). The 1659 herbarium was restored in 2012, reinforcing several pages.

The two herbaria combined contain a total of 105 plant specimens, although many more were originally present, judging from the remains of plants, labels and pages. The 1659 herbarium consists of two bundles of loose, thick paper sheets, folded over to produce a book-like structure. It lacks a cover of its

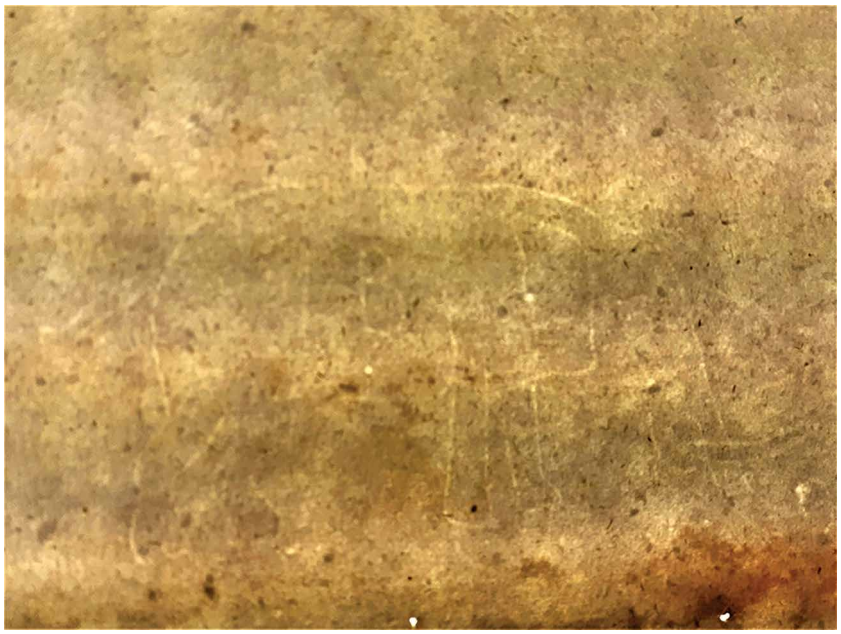

Fig. 1 Watermark of an elephant with the letter B, in the second last sheet of the 1659 Breyne herbarium. It is yet unknown which paper producer is associated with this mark.

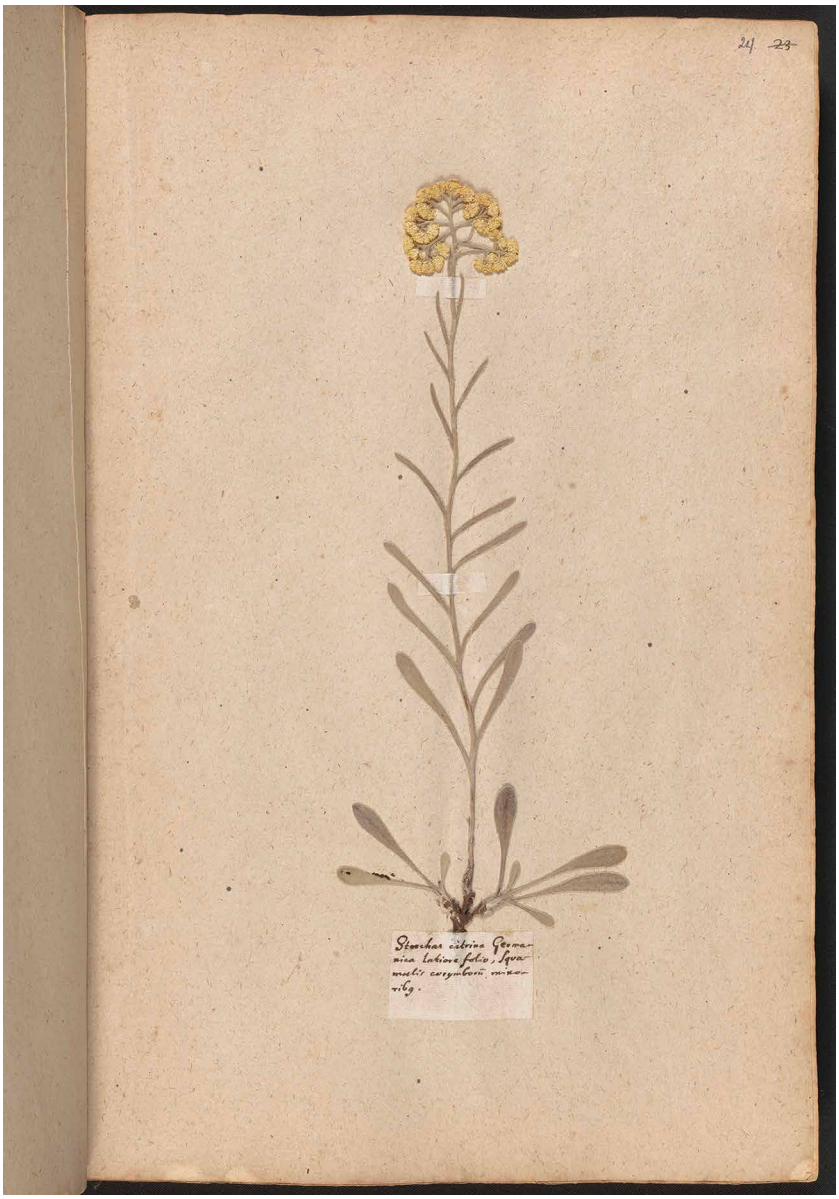

Fig. 2 A specimen of *Helichrysum arenarium* from the 1673 herbarium. This species is represented by six specimens in this herbarium.

own, but has been wrapped in an early 20th century cover with the Dutch title *Herbarium door JACOB BREYNE verzameld in de omgeving van Danzig. Anno 1659* (Herbarium by Jacob Breyne, collected in the surroundings of Danzig. Anno 1659). It contains 48 specimens, one or several per page, although a large number of empty sheets with remains and imprints of plants suggests there were once more. The second last sheet of the herbarium contains a watermark in the shape of an elephant with a 'B' on its body (Fig. 1). This watermark is not represented in the 'Memory of Paper' database. Hence, the origin of the paper is yet unknown.

The 1673 herbarium is bound into a book with the title *Plantae Rariores Borussiacae et Cassubicae anno 1673* (Rare Plants of Prussia and Kashubia anno 1673). It contains 57 specimens, generally one per page, and seems to be missing fewer plants than the 1659 herbarium: at least ten plants seem to be missing, and twelve pages have been cut out. Breyne is known to have made a 'duplicate' of the 1673 Leiden herbarium, which he sent to James Petiver in England and which is now in the collection of the Natural History Museum in London (as part of the Sloane Herbarium, HS 231, ff. 88-113), but not yet digitally available (Britten et al. 1958, Fleisher 2020). Future research into this herbarium could possibly give more insights into the specimens lost from the Leiden herbaria, but is beyond the scope of the current paper. A recent paper by Pękacka-Falkowska (2021) sheds more light on the correspondence between Breyne and Petiver.

Specimen composition

Both herbaria contain a large diversity of plants. A complete list of taxa present can be found in Appendix 1 for the 1659 herbarium and in Appendix 2 for the 1673 herbarium. The combined total of 105 specimens in both herbaria consists of 62 species from 24 families, including two *Lycopodiaceae* species and one fungus. Well-represented families are *Asteraceae* (29 specimens, 13 spp.) and *Apiaceae* (9 specimens, 5 spp.); 11 species were found in both herbaria. The same number of species were represented more than once within one of the herbaria (6 spp. in the 1659 herbarium, 5 spp. in the 1673), with six specimens of *Helichrysum arenarium* (L.) Moench (*Asteraceae*) (Fig. 2) and four of *Antennaria dioica* (L.) Gaertn. (*Asteraceae*). Breyne may have strived to document the diversity within these species, as his descriptions point at differences in, e.g., flower colour and leaf shape. Of *A. dioica* both staminate and pistillate plants are represented. It is not clear if this was by intention or coincidental, as Breyne did not add a remark on this difference. Sexual differentiation in plants only became apparent in the late 17th century, with the work of Camerarius (1694).

Removal of specimens

From the 1659 herbarium at least 60 specimens have been completely removed, as indicated by the remains of plants, labels and glue (Fig. 3). At least ten plants were removed from the 1673 herbarium. The removal seems to have taken place before the 20th century: Van Ooststroom (1942) mentioned only the

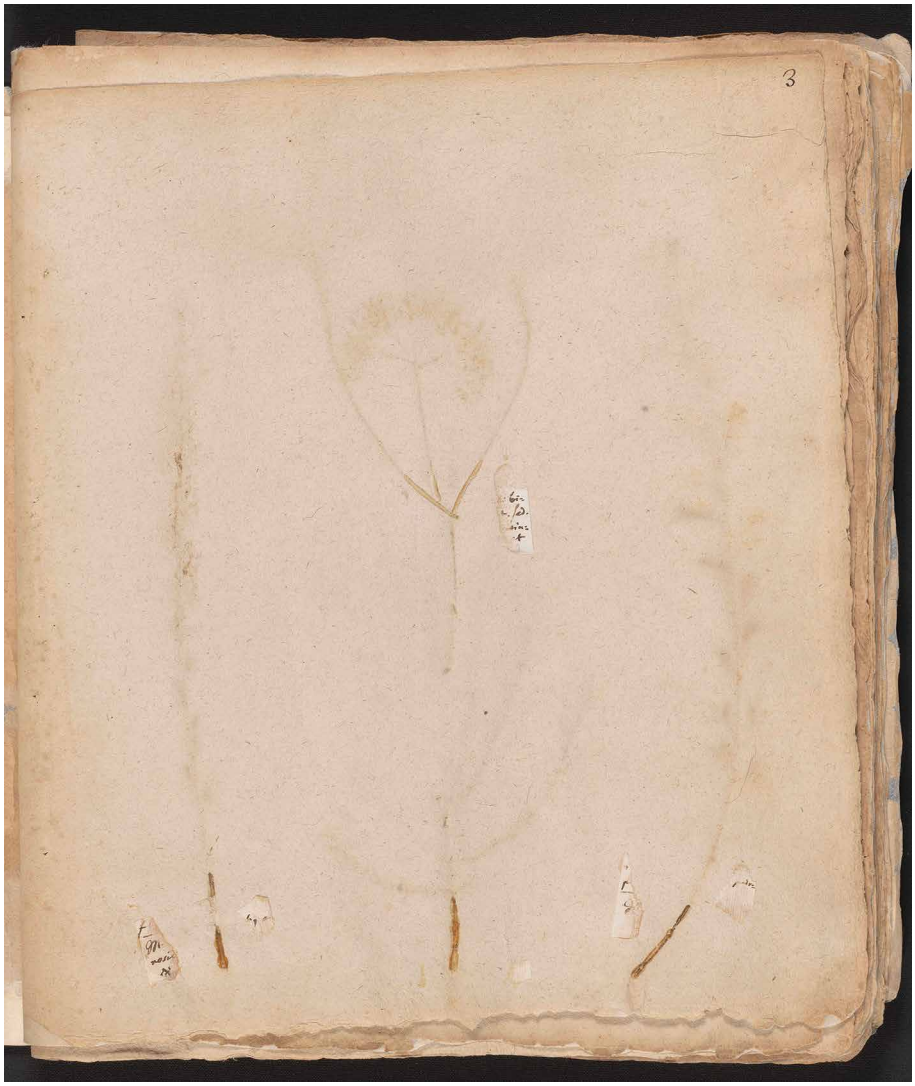

Fig. 3 Page 3 of the 1659 herbarium, showing the imprints of three removed specimens, as well as remains of their labels.

plants currently present, and also, evidence is lacking that De Monchy has identified plants that are no longer present. This means that any of the owners between Breyne himself and, eventually, the Rijksherbarium, could have removed (part of) the missing specimens.

Some plants have left impressions in the paper, giving indications of their shape and size. Determining species just from this imprint was, however, impossible. Where a plant had been removed, but labels and/or written text on the sheet remained, a tentative identification was attempted, such as in a case where Breyne mentioned 'nidus avis', and described a plant with stem, flowers, leaves and roots in a single, pale colour. The name, together with the mentioned colour pattern indicate that a specimen of the Bird's-Nest Orchid (*Neottia nidus-avis* (L.) Rich., *Orchidaceae*) was once present here. The same has been done for other pages with missing plants. Names deriving from these tentative identifications have been put between brackets in Appendices 1 and 2.

In a few instances, only the label was removed, often very roughly, while the corresponding specimen is still in place. This indicates a certain specific interest in the labels, as well as the specimens. It is unclear why someone removed these labels from the herbarium rather than simply copying the information.

On several pages, plant names have been written, but there is no indication that plants and/or labels were once present on these same pages. Fifteen such situations are found in the 1659 herbarium. Although plants may have been removed from these pages, leaving no traces, it is more likely that these pages never contained any plants, and that these names were just notes by Breyne, indicating species he was planning to include in the herbaria. From the 1673 herbarium, twelve pages have been cut out. These may or may not have contained plants. Again, it is not known who cut out these pages and why.

Both herbaria seem to have had their pages ordered differently in the past, as indicated by the page numbers written in the top right corner. The original numbers in the 1673 herbarium have been crossed out, and new numbers were written underneath. Why the order of the pages was changed, and who changed the page numbers in the 1673 herbarium, is as yet unknown.

Order of specimens

The plants within the 1659 herbarium do not seem to follow any particular order with regards to family, habitat, alphabetic or otherwise. Within the four sections of the 1673 herbarium, however, plants are arranged according to family, although Breyne most likely did not use the system of plant families as we know it today, but arranged his plants according to their resemblance, either observed by himself or by previous authors (Table 1).

Table 1 Plant families in the order as they appear in the 1673 herbarium. Plants in the 1659 herbarium were not arranged in any particular order.

Section	Family name	# specimens
1	*Santalaceae*	1
	Cornaceae	1
	Ericaceae	2
	Rosaceae	1
2	*Fabaceae*	3
	Cyperaceae	1
	Juncaceae	2
	Cyperaceae	2
	Poaceae	2
	Apiaceae	4
	Ranunculaceae	1
3	*Asteraceae*	20
4	*Boraginaceae*	3
	Brassicaceae	1

An exception is a mixing-up of *Cyperaceae* and *Juncaceae* in section 2. Breyne used the name 'Gramen' (grass) for most of these species (2 *Cyperaceae*, 2 *Juncaceae* and 2 *Poaceae*; for one *Cyperaceae* species, Breyne uses 'Juncus' (rush)), indicating that he considered them to be of the same group. Comparing with Caspar Bauhin's *Pinax* (1623), it seems differences between *Cyperaceae*, *Juncaceae* and *Poaceae* were not yet (completely) known in Breyne's time.

Plantae rariores …

The 1673 herbarium bears the title *Plantae Rariores Borussiaceae et Cassubicae*, indicating it would mainly contain rare plants from this region (modern Pomerania and Kashubia). In spite of the title, Breyne did not mention the abundance of taxa in this herbarium, something he regularly did in the 1659 herbarium. Some of the indications of abundance associated with Breyne's collected taxa have changed over time. While *Daucus carota* L. (*Apiaceae*), which Breyne mentioned as being found 'everywhere', is still considered Least Concern, *Dactylorhiza viridis* (L.) R.M.Bateman, Pridgeon & M.W.Chase (*Orchidaceae*), which flowered 'in great abundance' in Breyne's days, is now considered Regionally Extinct on the Red List for Gdańsk and surroundings (Markowski & Buliński 2004).

The Red List for the surroundings of Gdańsk (Markowski & Buliński 2004) mentions 26 taxa also present in Breyne's collections, with two taxa considered Regionally Extinct (*Swertia perennis* L. (*Gentianaceae*) and *Dactylorhiza viridis*; Fig. 4). One species is Critically Endangered (*Pulicaria dysenterica* (L.) Bernh, *Asteraceae*), while five are Endangered (*Anthoxanthum nitens* (Weber) Y.Schouten & Veldkamp (*Poaceae*), *Bupleurum longifolium* L. (*Apiaceae*), *Gentiana cruciata* L. (*Gentianaceae*),

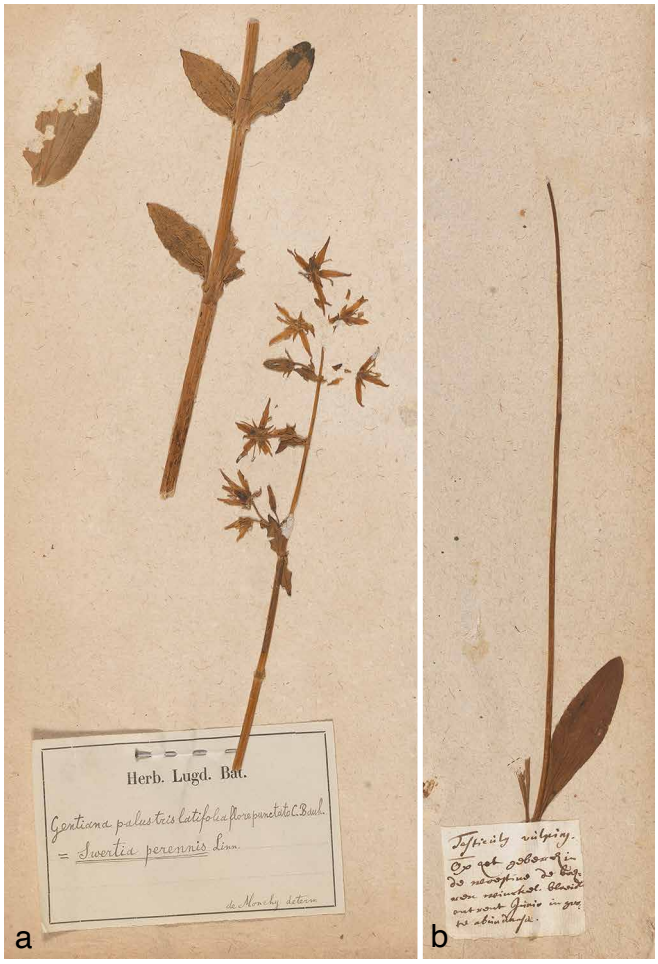

Fig. 4 Two specimens from the 1659 herbarium, representing species now considered regionally extinct (RE) around Gdańsk. a. *Swertia perennis*, with a label by De Monchy; b. *Dactylorhiza viridis*, with an original label by Breyne.

Table 2 Threatened and regionally extinct species from the Breyne herbaria, as mentioned on the Red List for Gdańsk and surrounding area (Markowski & Buliñski 2004).

Herbarium	Conservation status*	Species name**	Family
1659	VU	*Helianthemum nummularium* (L.) Mill.	*Cistaceae*
		Hypochaeris maculata L.	*Asteraceae*
		(*Pulsatilla pratensis* (L.) Mill.)	*Ranunculaceae*
		Pyrola rotundifolia L.	*Ericaceae*
	EN	*Anthoxanthum nitens* (Weber) Y.Schouten & Veldkamp	*Poaceae*
		(*Gentiana cruciata* L.)	*Gentianaceae*
		Silphiodaucus prutenicus (L.) Spalik, Wojew., Banasiak, Piwczynski & Reduron	*Apiaceae*
		Thesium ebracteatum Hayne	*Santalaceae*
	CR	*Pulicaria dysenterica* (L.) Bernh.	*Asteraceae*
	RE	*Dactylorhiza viridis* (L.) R.M.Bateman, Pridgeon & M.W.Chase	*Orchidaceae*
		Swertia perennis L.	*Gentianaceae*
1673	VU	*Alyssum alyssoides* (L.) L.	*Brassicaceae*
		Antennaria dioica (L.) Gaertn.	*Asteraceae*
		Viscum album L.	*Santalaceae*
	EN	*Anthoxanthum nitens* (Weber) Y.Schouten & Veldkamp	*Poaceae*
		Bupleurum longifolium L.	*Apiaceae*

* Conservation status as used by IUCN (2012): VU = Vulnerable, EN = Endangered, CR = Critically Endangered, RE = Regionally Extinct.
** Names in brackets indicate a tentative identification.

Fig. 5 Two leaves and an inflorescence of *Laportea canadensis* (above) and a specimen of *Lycopodium* sp. (below). *Laportea canadensis* is not known to occur in Europe, and so may have been sent to Breyne from its natural range in North America, or from a plant in cultivation.

Fig. 6 Map of northern Poland and a detail of Gdańsk and surrounding areas, showing the collecting locations mentioned in the Leiden Breyne herbaria. The town of Torún, mentioned once, lies south of the reach of this map.

Nr. on map	Placename acc. to Breyne	Modern placename	Nr. of mentions in herbaria
1	Insula Neringa	Mierzeja Wiślana	3
2	Be[e]ren	Kościerzyna	3
3	Mattaren	Matarnia	1
4	Oliwe	Oliwa	6
5	Bahrenwinckel	Niedźwiednik	9
6	Bringenz	Brętowo	3
7	Jasken/Jaskendahle	Jaśkową Soliną	2
8	gallows	Szubieniczna Góra	3
9	Miggauw	Piecki-Migowo	2
10	Wunderberge	Ujeśxiako-Łoaroqixw	1

Silphiodaucus prutenicus (L.) Spalik, Wojew., Banasiak, Piwczyński & Reduron (*Apiaceae*) and *Thesium ebracteatum* Hayne (*Santalaceae*)). Two of these species are currently threatened also at a national scale, namely *Swertia perennis* and *Thesium ebracteatum* (Kaźmierczakowa et al. 2014). The 1673 herbarium contains fewer (currently) rare plants than the 1659 herbarium (Table 2).

Exotics

Breyne's herbaria contain 34 species not known to (currently) occur in the region around Gdańsk (see Appendix 3). These may have been collected on trips further afield, or sent to Breyne by one of his many correspondents. One such exotic is a specimen of *Laportea canadensis* (L.) Wedd. (*Urticaceae*) in the 1659 herbarium (Fig. 5). This plant is native to the eastern parts of North America, and not known to have been introduced or escaped into the wild in Europe (Chew 1969). Judging from the small size of the specimen (two single leaves and a small inflorescence, rather than an entire plant), it may have been sent to Breyne in a letter, either from North America, or from a plant in cultivation. Sadly, Breyne did not label this specimen, leaving us to guess at its origins.

Other plants not currently known from the Gdańsk region include several species more commonly associated with higher elevations, such as *Buphthalmum salicifolium* L. (*Asteraceae*). Although the Gdańsk region is at a comparatively low elevation, Breyne mentions many of his collecting sites as being located between heather on hilly grounds, where some of these high-elevation species may have found a home too.

Ecological notes

On the labels of many specimens in the 1659 herbarium, Breyne provides notes on the collecting location. These notes often include the name of a town, but also some ecological remarks, the detail of which is remarkable for an early herbarium such as this. Many plants have been collected 'inter ericas', i.e., between heather. Some plants were collected in woodlands or meadows, many in hilly or mountainous surroundings. One specimen was collected 'in a lush forest', a second 'in a dark forest', while another was collected 'in a valley, at the side of running fountains'. According to his labels, Breyne collected multiple specimens in the grasslands around the Danzig gallows. The ecological notes in Breyne's herbaria can give us clues on the historical occurrence of ecosystems at the associated collecting locations. They show the occurrence of (possibly quite extensive) heather-covered hills in the Gdańsk area, as well as peatland ecosystems at 'Insula Neringa' (Mierzeja Wiślana), judging from specimens of *Eriophorum vaginatum* L. (*Cyperaceae*) and *Vaccinium uliginosum* L. (*Ericaceae*) collected there.

In one particular case, Breyne mentions on his label the co-occurrence of another species. For a specimen of *Pyrola chlorantha* Sw. (*Ericaceae*), Breyne mentions it growing where 'Calceolus Mar.' also grows. This name could refer to *Calceolus marianus* Mill., now a synonym of *Cypripedium calceolus* L., the Lady's Slipper Orchid (*Orchidaceae*).

On the labels of many specimens, Breyne mentions the flowering time. The months May, June, July and August are mentioned, suggesting Breyne collected mainly in these months. Other remarks found on the labels of both herbaria can be found in Appendix 4.

Collecting locations

On many labels in the 1659 herbarium, the location of collecting is mentioned (no place names are mentioned in the 1673 herbarium, except for Kashubia and Austria). Breyne used the German names of Prussian towns, and often with a deviating spelling. Many places are in the direct surroundings of Danzig, such as Bahrenwinkel (now Niedźwiednik), Jasken / Jaskendahle (Jaśkową Doliną), Bringenz (Brętowo) and Miggauw (Piecki-Migowo) (Fig. 6). Another popular collecting location was near the monastery at Oliwe (Oliwa). Two locations are further from Danzig: Beren / Beeren (Kościerzyna) and Neeringh / Insula Neringa (Mierzeja Wiślana). One town in central Poland is mentioned (Torunia; now known as Torún), from which Breyne was sent a specimen of *Pulsatilla* Mill. (*Ranunculaceae*).

Uses

With four specimens in the 1659 herbarium, Breyne mentioned that the plants were used by people. For two specimens of *Rhododendron tomentosum* Harmaja (*Ericaceae*) (pages 6 and 27), the use of this plant in brewing beer was mentioned. Breyne notes that the Swedes had imported 20 'voeder' (cartloads)

of this plant from the 'Neering' (Frische Nehrung, Mierzeja Wiślana) to add to their soldiers' beer, 'because it makes for furiousness'. Leaves of *R. tomentosum* (known as Labrador Tea) are still used in the production of alcoholic beverages today, although its use has been banned in the past for causing aggressive behaviour (Dampc & Luczkiewicz 2015).

Next to a specimen of *Huperzia selago* (L.) Bernh. ex Schrank & Mart. (*Lycopodiaceae)* on page 5, Breyne writes "dese Muscus drijefft soo sterck als Sabina" ('this Muscus expulses as strongly as Sabina'). Muscus was a name used for *Lycopodiaceae* (and other spore-bearing plants) by apothecaries (IPNI continuously updated); Sabina probably refers to *Juniperus sabina* L. (*Cupressaceae*), a plant known to have been used as an abortifacient (Riddle 1997). This indicates the application of *H. selago* as an abortifacient drug; a use indeed known from other parts of Europe (Hatfield 2004, Kenicer 2018).

Breyne also mentioned the consumption of the berries of *Vaccinium uliginosum* L. (*Ericaceae*) (a specimen on page 5), and how eating a large amount can cause drunkenness, "as if one had drunk much wine". The berries of this species are still eaten, and are known in German as Trunkelbeere ('drunk-berries') (Jäger 2011). Page 5 of the 1659 herbarium also contains a specimen of *Scleranthus perennis* L. (*Caryophyllaceae*). This is the host plant of *Porphyrophora polonica* (Linnaeus, 1758), the scale insect used to produce the dye known as Polish cochineal. Breyne and his family traded in Polish cochineal, so Breyne most likely knew the use of this plant in his trade. Nevertheless, he did not mention it on the label attached to the specimen.

The only reported use in the 1673 herbarium is that of *Anthoxanthum nitens* (Weber) Y.Schouten & Veldkamp (*Poaceae*). Breyne mentioned that the plants were harvested in the mountains only, and that they were given in bundles to young ladies in the spring, because of their scent. *Anthoxanthum nitens* is known for its scent, and was used as a strewing herb. As such, it was commonly used in churches, and even used as an alternative to incense (POWO continuously updated). In this context, it was dedicated to Mary in the Christian religion, which explains Breyne's use of the name Gramen Mariae.

Previous owners of the herbaria

Both herbaria seem to have been sent to correspondents of Breyne. It is known that both herbaria were in the possession of Hiëronymus van Beverningk (Pękacka-Falkowska 2018), but it is unknown whether he was the original receiver, or that he acquired them later. Within the handwritten texts of the 1659 herbarium, the abbreviation UE ('U Edele' = Your Honour) is found on three sheets (p. 2, 11, 12), along with indications that certain plants could be seen in other people's gardens (p. 11, 12; '…kunt UE sijn bij…' ['…Your Honour can see at…']), or that the specimen was sent to Breyne by this unknown 'Your Honour' (p. 2; '…die UE sende…' […'that Your Honour sent me…']).

On the frontispiece of the 1673 herbarium, three handwritten lines indicate that it was once part of a *Bibliothecae Latinae Publicae*. The handwriting is the same as that used in the *Codex Vossianus*, which includes several 16th-century book herbaria held in the library of Leiden University (Stefanaki et al. 2019). This makes it likely that the handwriting was added when this herbarium became part of the university library collection.

Other people mentioned

Next to authors of scientific works, several other names are mentioned in the 1659 herbarium. On page 11, Breyne writes that 'this species with broader leaves Your Honour can see with Sr. Hermanus van den Burch'. It is currently unknown who Hermanus van den Burch was, but he may have owned a garden in the Dutch Republic. The plant that went with the text is no longer present.

On the next page (p. 12), the name of 'my cos. [cousin] Johan Breynne' is mentioned, stating he had a form of the plant with narrow leaves, which is no longer present in the herbarium. Jacob Breyne had a cousin called Johannes Breyne, who lived in Amsterdam. Johannes traded in drugstore supplies, and may have had a garden of his own.

On the label of a specimen of *Pilosella lactucella* (Wallr.) P.D.Sell & C.West (*Asteraceae*) on page 20, the collecting location mentioned is 'in a meadow behind the Oliwe not far from Ambrosie's court, where the various Satyria stand'. Ambrosie could refer to the Dutch Mennonite distiller Ambrosius Vermöllen (also written as Vermeulen or Vermoellen), who had a distillery in Danzig in the early 17th century (Niemantsverdriet 1996), and may have had a garden outside the city near Oliwa, perhaps for growing the herbs used to make his *Danziger Goldwasser*. Satyria may refer to orchids in general, or to what is now known as *Dactylorhiza viridis*, previously known as *Satyrium viride* L. (cf. herbarium specimen L.0076018 in the general NBC herbarium).

In a piece of text written on an unnumbered sheet, Breyne states he has received 'Pulsatilla caerulea odoratissima' from Jacobus Hase, from Thorunia (Torún). It is unknown who Jacobus Hase was, and how he related to Breyne.

Centuria, Prodromus and Tentamen

Out of all species represented by specimens in both herbaria, only one is mentioned in Breyne's *Centuria* (1674: 130). This concerns what is probably a double-flowered form of water avens (*Geum rivale* L., *Rosaceae*). The *Centuria* contains an image of this plant, showing its multi-petalled flowers. None of the species present in the herbaria were mentioned in the *Prodromus*. Of the species in the 1659 herbarium, 12 are mentioned with a matching name and description in Gottfried Reyger's *Tentamen* (1764), while three species match partially (i.e., a very similar name with a matching description). For the 1673 herbarium, nine species match in name and description, while seven do so partially (Appendix 5). With seven specimens, Breyne mentioned his planned works *Pomerellia Viridario* and *Viridario Borussiaco*, which he never finished. Possibly, Breyne had already decided to include these species in his manuscripts, and used these specimens as a basis for his illustrations and/or descriptions.

Origin of specimens and function of the 1659 herbarium

Although most specimens in the 1659 herbarium have indications of their collecting location, and were thus most likely collected by Breyne himself, there are indications that some plants were sent to Breyne by others. In Breyne's days, a network of scholars exchanged knowledge (and for botanists: plant specimens) through letters. This network was known as the Republic of Letters, and included intellectuals from all over the world (Daston 1991). Breyne corresponded with many fellow botanists in Europe and elsewhere, such as Willem ten Rhyne (a doctor in service of the Dutch East India Company (VOC), visiting Japan and South Africa) and Hiëronymus van Beverningk in Leiden. Moreover, Breyne may have corresponded with garden owners and nurserymen, exchanging knowledge as well as specimens.

For some of the specimens in the 1659 herbarium we may expect that they came to Breyne through letters. Firstly, with two specimens Breyne actually mentioned the plants being sent to him. The specimen of *Swertia perennis* L. (*Gentianaceae*) on page 2 was sent by 'UE' ('Your Honour', see above). In a piece of text without a plant on an unnumbered sheet, it is mentioned that a specimen under the name of 'Pulsatilla caerulea odoratissima' was sent from Thorunia (Torún) by Jacobus Hase.

Furthermore, the specimens of *Laportea canadensis* (L.) Wedd. (*Urticaceae*) on page 13 may have been sent to Breyne as well, from North America or from a plant in cultivation. This species is not known to occur naturally in Europe, so it is unlikely that Breyne would have encountered it on his countryside trips. Secondly, the small size of the specimens would have allowed them to be included with a letter. Sadly, the *Laportea* specimens were not labelled by Breyne, leaving us without further clues as to their origin.

Although some references to a receiver ('UE', see above) would indicate that the 1659 herbarium was meant as a gift, the large number of pages without indications of plants being present would suggest a different use of (part of) this herbarium. Perhaps, Breyne used these sheets to (temporarily) store plants he received from, or was going to send to others, or that he was planning to discuss with fellow botanists. The 1673 herbarium was most likely made as a gift, judging from the large and elaborately arranged specimens, the amounts of text on each label and the fact this herbarium has been bound into a hardcover, as opposed to the loose sheets of the 1659 herbarium.

CONCLUSIONS

The two Breyne herbaria in the Leiden collection contain 62 species from 24 families, represented by a total of 105 specimens. While the specimens do not seem to have been placed in any particular order in the 1659 herbarium, a family-like arrangement is found in the 1673 herbarium. Many taxa are native to eastern Europe; the 34 represented taxa not locally native may have been sent to Breyne through his contacts in the Republic of Letters or collected on trips further afield. All of Breyne's collecting locations were reconstructed using his writing on the labels, yielding locations mostly near Gdańsk.

Many taxa are rarer today than they were in Breyne's day, as indicated in his handwritten texts on the labels. Out of all taxa in both herbaria, 24 are represented on a Red List for Gdańsk and surroundings and two in the Polish Red List. The species *Swertia perennis* and *Dactylorhiza viridis* are now considered regionally extinct, even though *D. viridis* was mentioned by Breyne as 'flowering in great abundance'. This shows the importance of historical herbaria in the reconstruction of the past distribution of plants, and the changes in the landscape around Gdańsk over the past three centuries.

Breyne mentioned uses of four taxa, as a strewing herb, for brewing and consumption, and as an abortifacient drug. Only one taxon represented in the herbaria is also mentioned in Breyne's 1674 *Centuria* (*Geum rivale*); none are mentioned in the *Prodromus*. Reyger (1764) mentioned multiple taxa found in Breyne's herbaria in his *Tentamen*.

The Breyne book herbaria give us an insight into the state of botany in the second half of the 17th century. After identification of the specimens, the names as given by Breyne, which he cited from the works of many other botanical authors, can be attributed to a modern binomial. Both herbaria, but especially the 1659 herbarium with its references to collecting locations, contain evidence for the historical occurrence of plant species, informing us on land use change, and allowing for informed decisions in the possible reintroduction of species.

As biodiversity worldwide faces large threats, it is important to know what species were once there, and their former abundance. This can help us understand what is already lost, and what we need to protect, or possibly restore. Herbaria in general have an important role to play in this process, but historical herbaria even more so. They can provide evidence of the occurrence of plants in pre-industrial times, showing parts of the vegetation of the area in which they were collected, before modern human interference. In addition, historical herbaria can provide information on the connections between plants and humans, in times when this was much more important in everyday life, than it is (or, rather, seems to be) today. Further research into the contents and producers of historical herbaria may help us in our aims to preserve biodiversity, as well as provide insights into the history of science and society in general.

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Appendix 1 Plants included in the 1659 herbarium.

Page nr.	Barcode	Specimen state	Location on sheet	Name(s) given by Breyne	Author(s) cited by Breyne	Family	Current identification	Species according to Van Ooststroom	Species according to De Monchy
unnumbered sheet	L.2112068	Specimen much damaged	Central	Hedisarum peregrinum	Carolus Clusius	***Lamiaceae***	***Lycopus europaeus*** L.	*Lycopus europaeus*	
2	L.2112069	Specimen present	Central	Gentiana palustris latifolia flore punctato Alisma folio glabro	Caspar Bauhin	***Gentianaceae***	***Swertia perennis*** L.	*Swertia perennis*	*Swertia perennis*
3	L.2112070	Specimen removed	Left			–	–		
	L.2112071	Specimen removed	Top Centre			–	–		
	L.2112072	Specimen removed	Bottom Centre			–	–		
	L.2112073	Specimen removed	Right			–	–		
unnumbered sheet	L.2112074	No Specimen		Gentiana cruciata major		(***Gentianaceae***)	(***Gentiana cruciata*** L.)		
unnumbered sheet	L.2112075	Specimen present	Central			***Poaceae***	***Anthoxanthum nitens*** (Weber) Y.Schouten & Veldkamp	*Hierochloë australis*	
4	L.2112076	Specimen present	Central	Teucrium		***Lamiaceae***	***Teucrium fruticans*** L.	*Teucrium fruticans*	
5	L.2112077	Specimen present	Top Left	Chamaecistus flore luteo	Caspar Bauhin	***Cistaceae***	***Helianthemum nummularium*** (L.) Mill.	*Helianthemum nummularium* ssp. *nummularium*	*Helianthemum vulgare*
	L.2112078	Specimen present	Top Right	Panax Chironicum Polygonum Polyg. Cocciferum	Pietro Mattioli	***Caryophyllaceae***	***Scleranthus perennis*** L.	*Scleranthus perennis*	*Scleranthus perennis*
	L.2112079	Specimen present	Bottom Left	Selago tertia Muscus erectus ramosus saturate viridis	Ioanne Thalio	***Lycopodiaceae***	***Huperzia selago*** (L.) Bernh. ex Schrank & Mart.	*Lycopodium Selago*	*Lycopodium selago*
	L.2112080	Specimen present	Bottom Right	Vaccinia Pannonica	Conrad Gesner	***Ericaceae***	***Vaccinium uliginosum*** L.	*Vaccinium uliginosum*	
6	L.2112081	Specimen present	Top Left	Cistus Ledon foliis rosimarini ferrugineis	Caspar Bauhin	***Ericaceae***	***Rhododendron tomentosum*** Harmaja	*Ledum palustre*	*Ledum palustre*
	L.2112082	Specimen present	Top Centre	Ferrum equinum siliqua singulari Sferro cavallo Solea equina	Caspar Bauhin	***Fabaceae***	***Hippocrepis unisiliquosa*** L.	*Hippocrepis unisiliquosa*	*Hippocrepis unisiliquosa*
	L.2112083	Specimen present	Top Right	Anonymos tenuifolia Anthyllis montana	Carolus Clusius	***Santalaceae***	***Thesium ebracteatum*** Hayne	*Thesium ebracteatum*	*Thesium intermedium*
	L.2112084	Specimen present, label removed	Bottom Left			***Asteraceae***	***Pulicaria dysenterica***	*Pulicaria dysenterica*	
	L.2112085	Specimen & label removed	Bottom Centre			–	–		
	L.2112086	Specimen present	Bottom Right	Viola barbata angustifolia	Jaques Dalechamps	***Caryophyllaceae***	***Dianthus carthusianorum*** L.	*Dianthus Carthusianorum*	*Dianthus armeria*
8	L.2112087	Specimen present	Left	Origanum speciosum		***Lamiaceae***	***Origanum vulgare*** L.	*Origanum vulgare*	
	L.2112088	Specimen present	Centre	Chamaenerion Gesnerii flore albo		***Onagraceae***	***Epilobium*** sp.	*Epilobium angustifolium*	*Epilobium palustre*
	L.2112089	Specimen present, label removed	Right			***Brassicaceae***	***Myagrum perfoliatum*** L.	*Myagrum perfoliatum*	
	L.2112090	Specimen & label removed	Bottom Right			–	–		
9	L.2112091	Specimen & label removed	Left			–	–		
	L.2112092	Specimen & label removed	Centre			–	–		
	L.2112093	Specimen much damaged	Right	Rapunculus spicatus flore albo		***Campanulaceae***	***Phyteuma spicatum*** L.	*Phyteuma spicatum*	*Phyteuma spicata*
10	L.2112094	Specimen & label removed	Left			–	–		
	L.2112095	Specimen & label removed	Right			–	–		
11	L.2112096	Specimen & label removed	Left			–	–		
	L.2112097	Specimen & label removed	Centre			–	–		
	L.2112098	Label removed, specimen mostly removed	Right			***Fagaceae***	***Fagus sylvatica*** L.		
12	L.2112099	Specimen & label removed	Left			–	–		
	L.2112100	Specimen present	Centre	Pyrola rotundifolia major fol. ampliore mollique	Caspar Bauhin	***Ericaceae***	***Pyrola rotundifolia*** L.	*Pirola rotundifolia*	

Appendix 1 (cont.)

Page nr.	Barcode	Specimen state	Location on sheet	Name(s) given by Breyne	Author(s) cited by Breyne	Family	Current identification	Species according to Van Ooststroom	Species according to De Monchy
	L.2112101	Specimen present	Right	Stoebe Austriaca	Carolus Clusius	***Asteraceae***	***Centaurea stoebe*** L.	*Centaurea maculosa* ssp. *rhenana*	
13	L.2112102	No label	Top			***Urticaceae***	***Laportea canadensis*** (L.) Wedd.	*Laportea canadensis*	
	L.2112103	No label	Bottom			***Lycopodiaceae***	***Lycopodium*** sp.	*Lycopodium complanatum* var. *anceps*	
15	L.2112104	Specimen & label removed	Left			–	–		
	L.2112105	Specimen & label removed	Centre			–	–		
	L.2112106	Specimen present	Right	Pyrola rotondifolia folio minore et atrovirose, flore luteo virescente inodor.		***Ericaceae***	***Pyrola rotundifolia*** L.	*Pirola chlorantha*	*Pyrola rotundifolia*
16	L.2112107	Specimen present, label removed, Specimen very damaged	Left			***Fabaceae***	***Vicia sylvatica*** L.	*Vicia sylvatica*	
	L.2112108	Specimen present, label removed, Specimen very damaged	Right			***Fabaceae***	***Vicia cracca*** L.	*Vicia Cracca*	
17	L.2112109	Specimen & label removed	Left			–	–		
	L.2112110	Specimen & label removed	Centre			–	–		
	L.2112111	Specimen & label removed	Right			–	–		
19	L.2112112	Specimen present	Left	Scorzonera montana humilis latifolia	Johann Bauhin	***Asteraceae***	***Scorzonera humilis*** L.	*Scorzonera humilis*	*Scorzonera humilis*
	L.2112113	Specimen present	Right	Hyracium Pannonicum latifolium majus folio non maculato		***Asteraceae***	***Hypochaeris maculata*** L.	*Hypochaeris maculata*	*Hieracium aurantiacum*
20	L.2112114	Specimen present	Top	Hyracium mont. latifol. folio macul	Carolus Clusius	***Asteraceae***	***Hypochaeris maculata*** L.	*Hypochaeris maculata*	*Crepis paludosa*
	L.2112115	Specimen & label removed	Botttom Left			–	–		
	L.2112116	Specimen present	Bottom Centre	Fungus ramosus Imperati S Digitelli			***Calocera viscosa*** (Pers.) Fr. or ***Clavulinopsis corniculata*** (Schaeff.) Corne	*Ramaria aurea*	
	L.2112117	Specimen present	Bottom Right	Lactucella sylv. repens	Joachim Camerarius the Younger	***Asteraceae***	***Pilosella lactucella*** (Wallr.) P.D.Sell & C.West	*Hieracium Bauhini* ssp. *filiferum*	
21	L.2112118	Specimen & label removed	Left			–	–		
	L.2112119	Specimen present	Right	Daucus montanus hirsuteus		***Apiaceae***	***Daucus carota*** L.	*Daucus Carota*	*Libanotis montana*
22	L.2112120	Specimen & label removed	Left			–	–		
	L.2112121	Specimen & label removed	Right			–	–		
23	L.2112122	Specimen present	Left	Daucus λασιόκαυλος	Ioanne Thalio	***Apiaceae***	***Silphiodaucus prutenicus*** (L.) Spalik, Wojew., Banasiak, Piwczynski & Reduron	*Laserpitium prutenicum*	
	L.2112123	No Specimen	Top Right	Myrris altera parva	Mathias de l'Obel	–	–		
	L.2112124	Specimen present	Bottom Right	Meum alterum Silesiacum flore amethistino	Joachim Camerarius the Younger	***Apiaceae***	***Chaerophyllum hirsutum*** L.	*Chaerophyllum hirsutum*	
24	L.2112125	Specimen present, label removed	Left			***Orchidaceae***	***Dactylorhiza*** sp.	*Orchis maculata*	
	L.2112126	No Specimen	Top Centre	Orobanche quibusdam Hypopitis flore sulphureo languinoso		(***Orobanchaceae***)	(***Orobanche*** sp.)		
	L.2112127	Specimen & label removed	Centre Left			–	–		
	L.2112128	Specimen & label removed	Centre Right			–	–		

Appendix 1 (cont.)

Page nr.	Barcode	Specimen state	Location on sheet	Name(s) given by Breyne	Author(s) cited by Breyne	Family	Current identification	Species according to Van Ooststroom	Species according to De Monchy
	L.2112129	Specimen present	Right	Testiculus vulpinus		***Orchidaceae***	(***Dactylorhiza viridis*** (L.) R.M.Bateman, Pridgeon & M.W.Chase)	*Orchidaceae* sp.	
25	L.2112130	Specimen present	Bottom Left	Phalangrium ramosum		***Asparagaceae***	***Anthericum ramosum*** L.	*Anthericum ramosum*	
	L.2112131	Specimen present	Bottom Centre	Spartum 3	Mathias de l'Obel	***Poaceae***	***Nardus stricta*** L.	*Nardus stricta*	
	L.2112132	Specimen present	Bottom Right	Juncus alpinus capitulo languinoso		***Cyperaceae***	***Eriophorum vaginatum*** L.	*Eriophorum vaginatum*	
				(on sheet) Juncus alpinus cum caude leporina	Caspar Bauhin				
	L.2112133	Specimen present	Top Right	Serapias minor rubello ni-flore-tente flore angustifolia nullis inspersis punctulis	Mathias de l'Obel	***Orchidaceae***	**Orchidaceae** sp.	*Orchidaceae* sp.	
26	L.2112134	Specimen & label removed	Left				–	–	
	L.2112135	Specimen & label removed	Right				(***Pteridophyta*** sp.)	(***Pteridophyta*** sp.)	
unnumbered sheet	L.2112136	Specimen & label removed	Left				–	–	
	L.2112137	Specimen & label removed	Right				–	–	
	L.2112138	Specimen & label removed	Central	Flos / Semen			–	–	
unnumbered sheet	L.2112139	No Specimen	Top	Muscus terrestris clavatus Lycopodium s. Pes Lupi. Selago s	Caspar Bauhin Ioanne Thalio	(***Lycopodiaceae***)	(***Lycopodiaceae*** sp./spp.)		
	L.2112140	No Specimen	Bottom	(upside down) Lycopodium s. Pes Lupi			–	–	
27	L.2112141	Specimen removed	Top	Ledon Silesiacum	Carolus Clusius	(***Ericaceae***)	(***Rhododendron tomentosum*** Harmaja)	*Ledum palustre*	
				Rosmarinus sylvest. Chamaepeuce	Rembert Dodoens Euricius Cordius				
				Cistus Ledon foliis rorismarini ferrugineis	Caspar Bauhin				
unnumbered sheet	L.2112142	No Specimen	Top	Pulsatilla ranunculi folio obtusiore	Jacob Breyne	(***Ranunculaceae***)	(***Pulsatilla*** sp.)		
				Pulsatilla folio annemones secundae	Caspar Bauhin				
	L.2112143	No Specimen	Centre Right	Pulsatilla caerulea odoratissima		(***Ranunculaceae***)	(***Pulsatilla*** sp.)		
	L.2112144	No Specimen	Centre	Lichen petrae: fol. supern. virid. prona parte alb : nervis nigris distinctis foliorum extremis orbiculis nigris tumidis			(**lichen** sp.)		
	L.2112145	No Specimen	Bottom Left	Pulsatilla vernalis apii folio flore majore		(***Ranunculaceae***)	(***Pulsatilla*** sp.)		
	L.2112146	No Specimen	Bottom Right	Pulsatilla flore clauso caeruleo	Johann Bauhin	(***Ranunculaceae***)	(***Pulsatilla pratensis*** (L.) Mill.)		
unnumbered sheet	L.2112148	No Specimen	Bottom Left	Gnaphalium Creticum non descriptum		(***Asteraceae***)	(***Asteraceae*** sp.)		
	L.2112149	No Specimen	Top Left	Gnaphalium maximum		(***Asteraceae***)	(***Asteraceae*** sp.)		
	L.2112150	No Specimen	Left Centre	Helyochryson Orientale	Caspar Bauhin	(***Asteraceae***)	(***Asteraceae*** sp.)		
2	L.2112151	Specimen & label removed	Left				–	–	
	L.2112152	Specimen & label removed	Centre				–	–	
	L.2112153	Specimen present	Right	Stoechas rubescens		***Asteraceae***	***Helichrysum arenarium*** (L.) Moench	*Helichrysum arenarium*	
	L.2112154	Specimen & label removed	Far Right				–	–	
3	L.2112155	Specimen & label removed	Left				–	–	
	L.2112156	Specimen present	Centre Top	Origanum speciosum sive varietas		***Lamiaceae***	***Origanum vulgare*** L.	*Origanum vulgare*	
	L.2112157	Specimen & label removed	Centre Bottom				–	–	

Appendix 1 (cont.)

Page nr.	Barcode	Specimen state	Location on sheet	Name(s) given by Breyne	Author(s) cited by Breyne	Family	Current identification	Species according to Van Ooststroom	Species according to De Monchy
	L.2112158	Specimen & label removed	Right			–	–		
4	L.2112159	Specimen & label removed	Left			–	–		
	L.2112160	Specimen & label removed	Centre			–	–		
	L.2112161	Specimen present	Right Top	Veronica flore candido		***Plantaginaceae***	***Veronica officinalis*** L. (f. *albiflora* (G.Don) House)	*Veronica officinalis*	
	L.2112162	Specimen & label removed	Right Bottom			–	–		
5	L.2112163	Specimen & label removed	Left			–	–		
	L.2112164	Specimen & label removed	Centre			–	–		
	L.2112165	Specimen present	Right	Vaccinia Pannonica	Conrad Gesner	***Ericaceae***	***Vaccinium uliginosum*** L.	*Vaccinium uliginosum*	
6	L.2112166	Specimen & label removed	Left			–	–		
	L.2112167	Specimen present	Centre	Vicicia dumetorum maxima, multiflora, flore albo, venulis purpureis, elegantissimis striatis		***Fabaceae***	***Vicia sylvatica*** L.	*Vicia sylvatica*	
	L.2112168	Specimen & label removed	Right			–	–		
unnumbered sheet	L.2112169	Specimen & label removed	Centre Top			–	–		
	L.2112170	Specimen & label removed	Centre Bottom			–	–		
	L.2112171	Specimen removed	Right Top	Nidus avis		(***Orchidaceae***)	(***Neottia nidus-avis*** (L.) Rich.)		
	L.2112172	Specimen & label removed	Right Bottom			–	–		
8	L.2112173	Specimen & label removed	Left			–	–		
	L.2112174	Specimen present	Centre	Aster montanus luteus salicis glabro folio	Caspar Bauhin	***Asteraceae***	***Buphthalmum salicifolium*** L.	*Inula salicina*	
	L.2112175	Specimen present	Right	Lactucella sylvestris repens	Joachim Camerarius the Younger	***Asteraceae***	***Pilosella piloselloides*** (Vill.) Soják	*Hieracium Bauhini* cf. ssp. *filiferum*	
unnumbered sheet	L.2112176			(writing illegible)					
9	L.2112177	Specimen & label removed	Left			–	–		
	L.2112178	Specimen & label removed	Centre			–	–		
	L.2112179	Specimen & label removed	Right			–	–		
10	L.2112180	Specimen & label removed	Left			–	–		
	L.2112181	Specimen present	Right	Ranunculus montanus subhirsutus latifolius	Caspar Bauhin	***Ranunculaceae***	***Ranunculus lanuginosus*** L.	*Ranunculus lanuginosus*	
11	L.2112182	Specimen & label removed	Central			(***Apiaceae***)	(***Apiaceae*** sp.)		
12	L.2112183	Specimen & label removed	Left			–	–		
	L.2112184	Specimen present	Right	Meum alterum Silesiacum flore amethistino	Joachim Camerarius the Younger	***Apiaceae***	***Chaerophyllum hirsutum*** L.	*Chaerophyllum hirsutum*	
13	L.2112185	Specimen present	Left	Daucus λασιόκαυλος	Ioanne Thalio	***Apiaceae***	***Silphiodaucus prutenicus*** (L.) Spalik, Wojew., Banasiak, Piwczynski & Reduron	*Laserpiticum prutenicum*	
	L.2112186	Specimen & label removed	Right			–	–		
14	L.2112187	Specimen & label removed	Left			–	–		
	L.2112188	Specimen & label removed	Centre Top			–	–		
	L.2112189	Specimen present	Centre Bottom	Thalictrum B. angustifolium	Joachim Camerarius the Younger	***Ranunculaceae***	***Thalictrum lucidum*** L.	*Thalictrum lucidum*	
	L.2112190	Specimen & label removed	Right			–	–		
unnumbered sheet	L.2112191	No Specimen	Top	Alisma Tassani Caroli Gentiana 12 et punctata	Johann Bauhin Carolus Clusius	(***Gentianaceae***)	(***Swertia perennis*** L.)		
unnumbered sheet	L.2112192	No Specimen	Left Bottom	Leontopodium creticum		(***Asteraceae***)	(***Asteraceae*** sp.)		
	L.2112193	No Specimen	Left Centre	Leontopodium Mathioli		(**Asteraceae**)	(**Asteraceae** sp.)		
	L.2112194	No Specimen	Left Top	Gnaphalium roseum hortense			(***Asteraceae***)		(***Asteraceae*** sp.)
	L.2112195	No Specimen	Centre centre	Leontopodium alterum	Mathias de l'Obel	(***Asteraceae***)	(***Asteraceae*** sp.)		
	L.2112196	No Specimen	Centre Top	Gnaphalium Roseum sylvest.		(***Asteraceae***)	(***Asteraceae*** sp.)		
	L.2112197	No Specimen	Right Top	Gnaphalium unicaule Hispanicum		(***Asteraceae***)	(***Asteraceae*** sp.)		

Appendix 2 Plants included in the 1673 herbarium.

Section nr	Page nr (new)	Page nr (crossed out)	Barcode	Specimen state	Location on sheet	Name(s) mentioned by Breyne	Author(s) cited by Breyne	Family	Current identification
1	–	62	L.2112021	Specimen present	Central	Viscum Viscum baccis albis	Johann Bauhin Caspar Bauhin	***Santalaceae***	***Viscum album*** L.
	2	64	L.2112022	Specimen present	Central	Cornus foemina, putata Virga Sanguinea Cornus foemina Frutex sanguinus	Johann Bauhin Caspar Bauhin Pierre Belon	***Cornaceae***	***Cornus sanguinea*** L.
	3	67	L.2112023	Specimen present	Central	Ledum silesiacum		***Ericaceae***	***Rhododendron tomentosum*** Harmaja
	4	68	L.2112024	Specimen present	Central	Chamaerhododendros Montana Alloborgum Oleastrifolio, seu Lentisci folio minus odora	Mathias de l'Obel	***Ericaceae***	***Andromeda polifolia*** L.
	5	69	L.2112025	Specimen present	Central	Caryophyllata Montana tertia	Carolus Clusius	***Rosaceae***	***Geum rivale*** L. (double-flowered form)
2	7	45	L.2112027	Specimen present	Central	Vicia dumetorum Vicia hancpulcherrimam		***Fabaceae***	***Vicia sylvatica*** L.
	8	46	L.2112028	Specimen present	Central	Vicia minima vernalis radice tuberose		***Fabaceae***	***Vicia lathyroides*** L.
	9	48	L.2112029	Specimen present	Central	Onobrychis × floribus Viciae dilute caeruleis Onobrychis qvibusdam subcaeruleo flore Onobrychis Secunda	Caspar Bauhin Johann Bauhin Carolus Clusius	***Fabaceae***	***Astragalus arenarius*** L.
	10	49	L.2112030	Specimen present	Central	Juncus alpinus cum cauda Leporina Juncus alpinus capitula lanuginoso	Johann Bauhin Caspar Bauhin	***Cyperaceae***	***Eriophorum vaginatum*** L.
	11	50	L.2112031	Specimen present	Central	Gramen nemorosum hirstutum primum, sive latifolium majus Gramen rore lusidum nemoroese, sive Luzulae Gramen hirsutum nemorosum	Caspar Bauhin Johann Bauhin Mathias de l'Obel	***Juncaceae***	***Luzula pilosa*** (L.) Willd.
	12	51	L.2112032	Specimen present	Central	Gramen nemorosum hirsute. quartu., Gramen hirsutum capitulo globoso Gramen Lucidum Gramen capitulo lucido globoso Tabernaemontani	Caspar Bauhin Jacobus Tabernaemontanus Johann Bauhin	***Juncaceae***	***Luzula multiflora*** (Ehrh.) Lej.
	13	53	L.2112033	Specimen present	Central	Gramen Sylvaticu. parvu. Tenuifolium rigidiusculum Gramen nemorosum glabrus Gramen nemorosum Spica ruffescente molli Gramen nemorosum i	Johann Bauhin Caspar Bauhin Jacobus Tabernaemontanus	***Cyperaceae***	***Carex montana*** L.
	14	54	L.2112034	Specimen present	Central	Gramen spicatum montanum et nemorosum 4 Gramen caryophyllatum montanum Spicae varia Gramen caryophyllatum montanum Spica varia Caspari Bauhini	Caspar Bauhin Johann Bauhin	***Cyperaceae***	***Carex digitata*** L.
	15	55	L.2112035	Specimen present	Central	Gramen Mariae odoratum Gramen paniculatum montanum 2 Gramen paniculatum odoratum	Johann Bauhin Caspar Bauhin	***Poaceae***	***Anthoxanthum nitens*** (Weber) Y.Schouten & Veldkamp
	16	56	L.2112036	Specimen present	Central	Gramen nemorale avenaceum alterum ex fusco xerampelinum et lucidum Danicum Gramen avenaceum 4, sive capillaceum minoribus glumis	Adver: (?) & Johann Bauhin Caspar Bauhin	***Poaceae***	***Avenella flexuosa*** (L.) Drejer
	17	57	L.2112037	Specimen present	Central	Perfoliata alpina magna, longifolia Perfoliata Montana latifolia Perfoliata Montana	Johann Bauhin Caspar Bauhin Joachim Camerarius the Younger	***Apiaceae***	***Bupleurum longifolium*** L.
	18	58	L.2112038	Specimen present	Central	Meum Silesiacum, flore amethistino Cicutaria latifolia hirsuta, flore amethistino Cicutaria palustris, latifolia rubra	Joachim Camerarius the Younger Johann Bauhin Caspar Bauhin	***Apiaceae***	***Chaerophyllum hirsutum*** L.
	19	59	L.2112039	Specimen present	Central	Apium petraeum, sive montanum album, tenuioribus foliis	Johann Bauhin	***Apiaceae***	***Seseli libanotis*** (L.) W.D.J.Koch

Appendix 2 (cont.)

Section nr	Page nr (new)	Page nr (crossed out)	Barcode	Specimen state	Location on sheet	Name(s) mentioned by Breyne	Author(s) cited by Breyne	Family	Current identification
	20	60	L.2112040	Specimen present	Central	Apium petraeum, sive montanum album, latiore folio		***Apiaceae***	***Seseli libanotis*** (L.) W.D.J.Koch
						Daucus montanus Apiifoli mino	Caspar Bauhin		
						Daucus montanus Apiifolio albicans	Caspar Bauhin		
	21	61	L.2112041	Specimen present	Central	Thalictrum septimum	Caspar Bauhin	***Ranunculaceae***	***Thalictrum lucidum*** L.
						Thalictrum pratense angustissimo folio			
3	23	22	L.2112043	Specimen present	Central	Stoechas citrina Germanica latiore folio	Johann Bauhin	***Asteraceae***	***Helichrysum arenarium*** (L.) Moench
						Stoechas citrine latifolia	Caspar Bauhin		
						Amaranthus luteus	Leonhard Fuchs, Hieronymus Bock, Jacobus Tabernaemontanus		
						Stoechas citrine tenuifolia Narbonensis	Johann Bauhin		
	24	23	L.2112044	Specimen present	Central	Stoechas citrina Germanica latiore folio, squamulis corymborii Minoribus		***Asteraceae***	***Helichrysum arenarium*** (L.) Moench
	25	24	L.2112045	Specimen present	Central	Stoechas aurea Germanica		***Asteraceae***	***Helichrysum arenarium*** (L.) Moench
	26	25	L.2112046	Specimen present	Left	Stoechas ruffa, sive colore igneo Cassubica Latiore folio		***Asteraceae***	***Helichrysum arenarium*** (L.) Moench
	26	25	L.2112047	Specimen present	Middle	Stoechas ignescens, sive ruffa Cassubica Latiore folio		***Asteraceae***	***Helichrysum arenarium*** (L.) Moench
	26	25	L.2112048	Specimen present	Right	Stoechas ruffa, sive colore igneo Cassubica Latiore folio		***Asteraceae***	***Helichrysum arenarium*** (L.) Moench
	27	26	L.2112049	Specimen present	Central	Gnaphalium ad Stoechadem citrinam accedens	Johann Bauhin	***Asteraceae***	***Helichrysum luteoalbum*** (L.) Rchb.
						Helichrysum 8	Caspar Bauhin		
						Elichrysum Sylvestre latifolium capitulis conglobates			
	28	27	L.2112050	Specimen present	Central	Gnaphalium medium	Jacobus Tabernaemontanus	***Asteraceae***	***Filago germanica*** (L.) Huds.
						Gnaphalio vulgari simile	Johann Bauhin		
						Gnaphalium 4, sive medium	Caspar Bauhin		
	29	28	L.2112051	Specimen present	Central	Gnaphalium montanum flore rotundiore candido	Caspar Bauhin	***Asteraceae***	***Antennaria dioica*** (L.) Gaertn.
						Gnaphalium montanum album	Mathias de l'Obel		
						Pilosella major flore candido	Johann Bauhin		
	30	30	L.2112052	Specimen present	Central	Gnaphalium montanum flore rotundiore roseo	Caspar Bauhin	***Asteraceae***	***Antennaria dioica*** (L.) Gaertn.
						Pilosella major flore magis purpurascente	Johann Bauhin		
	31	32	L.2112053	Specimen present	Central	Gnaphalium montanum longiore flore purpureo		***Asteraceae***	***Antennaria dioica*** (L.) Gaertn.
						Pilosella minor flore purpurante	Johann Bauhin		
	32	33	L.2112054	Specimen present	Central	Gnaphalium montanum longiore flore purpureo, punctis nigris insperis		***Asteraceae***	***Antennaria dioica*** (L.) Gaertn.
	33	35	L.2112055	Specimen present	Central	Pilosella minoris flore, hirsutior et elatior non repens	Johann Bauhin	***Asteraceae***	***Pilosella piloselloides*** (Vill.) Soják
						Pilosella major erecta	Caspar Bauhin		
						Hieracium XXII sive murorum angustifolium non sinuati	Caspar Bauhin		
	34	36	L.2112056	Specimen present	Central	Hieracium montanum hirsutum VI	Caspar Bauhin	***Asteraceae***	***Hypochaeris maculata*** L.
						Hieracium alpinum latifolium hirsutum incanum flore magno			
						Hieracium latifolium 1	Carolus Clusius		
						Hieracium latifolium Pannonicum	Joachim Camerarius the Younger		
						Hieracium Pannonicum latifolium 1	Carolus Clusius		
						Pilosella majori	Johann Bauhin		
						Pulmonariae luteae accidens			
	35	37	L.2112057	Specimen present	Central	Hieracium caule aphyllo hirsutum	Johann Bauhin	***Asteraceae***	***Hypochaeris radicata*** L.
	36	39	L.2112058	Specimen present	Central	Hieracium fruticosum angustifolium minimum		***Asteraceae***	***Buphthalmum salicifolium*** L.
						Hieracium fruticosum VI			
	37	40	L.2112059	Specimen present	Central	Hieracium fruticosum angustifolium medium umbellatum		***Asteraceae***	***Hieracium umbellatum*** L.
						Hieracium fruticosum V			

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Section nr	Page nr (new)	Page nr (crossed out)	Barcode	Specimen state	Location on sheet	Name(s) mentioned by Breyne	Author(s) cited by Breyne	Family	Current identification
	38	41	L.2112060	Specimen present	Central	Scorzonera Latifolia 4, sive humilis nervosa Scorzonera humilis latifolia Pannonica 2 Tragopogonis Species Scorzonera humilis latifolia	Caspar Bauhin Carolus Clusius Johann Bauhin	***Asteraceae***	***Scorzonera humilis*** L.
	39	42	L.2112061	Specimen present	Central	Scorzonera angustifolia prima Scorzonera humilis angustifolia et Pannonica tertia Tragopogonis species Scorzonera humilis angustifolia	Caspar Bauhin Carolus Clusius Johann Bauhin	***Asteraceae***	***Scorzonera humilis*** L.
	40	44	L.2112062	Specimen present	Central	Stoebe Gallica et Austriaca Stoebe foliis lacinatus 3 Stoebe Major caliculis non splendentibus Centaurii majoris species tenuifolia	Carolus Clusius Caspar Bauhin Johann Bauhin	***Asteraceae***	***Centaurea stoebe*** L.
4	42	1	L.2112064	Specimen present	Central	Echium montanum flore ex dilute caeruleo et albo variegato		***Boraginaceae***	***Echium vulgare*** L.
	43	2	L.2112065	Specimen present	Central	Echium montanum flore purpuro violaceo		***Boraginaceae***	***Echium vulgare*** L.
	44	3	L.2112066	Specimen present	Central	Echium montanum flore carneo		***Boraginaceae***	***Echium vulgare*** L. (pink form)
	45	6	L.2112067	Specimen present	Central	Alysson 2 Thlaspi Alysson dictum campestre minus Alyssum minimum Thlaspi minus quibusdam, aliis Alysson minus	Caspar Bauhin Carolus Clusius Johann Bauhin	***Brassicaceae***	***Alyssum alyssoides*** (L.) L.

Appendix 3 Current occurrence of species from the herbaria in Pomerania *.

Current identification	Family	Current occurrence in Pomerania
Alyssum alyssoides (L.) L.	*Brassicaceae*	n
Andromeda polifolia L.	*Ericaceae*	y
Antennaria dioica (L.) Gaertn.	*Asteraceae*	n
Anthericum ramosum L.	*Asparagaceae*	n
Anthoxanthum nitens (Weber) Y.Schouten & Veldkamp	*Poaceae*	y
Astragalus arenarius L.	*Fabaceae*	n
Avenella flexuosa (L.) Drejer	*Poaceae*	y
Buphthalmum salicifolium L.	*Asteraceae*	n
Bupleurum longifolium L.	*Apiaceae*	n
(*Calocera viscosa* (Pers.) Fr. / *Clavulinopsis corniculata* (Schaeff.) Corner)	*Dacrymycetaceae* / *Clavariaceae*	n / n
Carex digitata L.	*Cyperaceae*	n
Carex montana L.	*Cyperaceae*	n
Centaurea stoebe L.	*Asteraceae*	n
Chaerophyllum hirsutum L.	*Apiaceae*	n
Cornus sanguinea L.	*Cornaceae*	y
(*Dactylorhiza viridis* (L.) R.M.Bateman, Pridgeon & M.W.Chase)	*Orchidaceae*	n
Daucus carota L.	*Apiaceae*	y
Dianthus carthusianorum L.	*Caryophyllaceae*	y
Echium vulgare L.	*Boragniaceae*	y
Eriophorum vaginatum L.	*Cyperaceae*	y
Fagus sylvatica L.	*Fagaceae*	y
Filago germanica (L.) Huds.	*Asteraceae*	n
(*Gentiana cruciata* L.)	*Gentianaceae*	n
Geum rivale L.	*Rosaceae*	y
Helianthemum nummularium (L.) Mill.	*Cistaceae*	n
Helichrysum arenarium (L.) Moench	*Asteraceae*	y
Helichrysum luteoalbum (L.) Rchb.	*Asteraceae*	n
Hieracium umbellatum L.	*Asteraceae*	y
Hippocrepis unisiliquosa L.	*Fabaceae*	n
Huperzia selago (L.) Bernh. ex Schrank & Mart.	*Lycopodiaceae*	y
Hypochaeris maculata L.	*Asteraceae*	n
Hypochaeris radicata L.	*Asteraceae*	n
Laportea canadensis (L.) Wedd.	*Urticaceae*	n
Luzula multiflora (Ehrh.) Lej.	*Juncaceae*	y
Luzula pilosa (L.) Willd.	*Juncaceae*	y
Lycopus europaeus L.	*Lamiaceae*	y
Myagrum perfoliatum L.	*Brassicaceae*	n
Nardus stricta L.	*Poaceae*	y
(*Neottia nidus-avis* (L.) Rich.)	*Orchidaceae*	n
Origanum vulgare L.	*Lamiaceae*	y
Phyteuma spicatum L.	*Campanulaceae*	y
Pilosella lactucella (Wallr.) P.D.Sell & C.West	*Asteraceae*	n
Pilosella piloselloides (Vill.) Soják	*Asteraceae*	n
Pulicaria dysenterica (L.) Bernh.	*Asteraceae*	n
(*Pulsatilla pratensis* (L.) Mill.)	*Ranunculaceae*	y
Pyrola rotundifolia L.	*Ericaceae*	n
Ranunculus lanuginosus L.	*Ranunculaceae*	n
Rhododendron tomentosum Harmaja	*Ericaceae*	y
Scleranthus perennis L.	*Caryophyllaceae*	n
Scorzonera humilis L.	*Asteraceae*	n
Seseli libanotis (L.) W.D.J.Koch	*Apiaceae*	n
Silphiodaucus prutenicus (L.) Spalik, Wojew., Banasiak, Piwczynski & Reduron	*Apiaceae*	n
Swertia perennis L.	*Gentianaceae*	n
Teucrium fruticans L.	*Lamiaceae*	n
Thalictrum lucidum L.	*Ranunculaceae*	n
Thesium ebracteatum Hayne	*Santalaceae*	n
Vaccinium uliginosum L.	*Ericaceae*	y
Veronica officinalis L. (f. *albiflora* (G.Don) House)	*Plantaginaceae*	y
Vicia cracca L.	*Fabaceae*	y
Vicia lathyroides L.	*Fabaceae*	n
Vicia sylvatica L.	*Fabaceae*	n
Viscum album L.	*Santalaceae*	y

* This table lists the plants found in the combined Leiden Breyne herbaria, along with their current occurrence in Pomerania province, according to 'Flowering plants and pteridophytes of Poland: a checklist' (Mirek et al. 2002). Tentative identifications are listed in brackets. (y = yes, n = no).

Appendix 4 Miscellaneous remarks by Breyne.

Many specimens in both herbaria come with remarks on collecting location, flowering time, but with some specimens, Breyne placed other remarks. These are listed below. Our translations and interpretations are placed in square brackets.

In the 1659 herbarium:

Page 2, with *Swertia perennis* L. (*Gentianaceae*): Collected in 1659. There are two types, different in the 'decency' of the flowers. One has large and sharply pointed flowers, and was sent by 'Your Honour'. The other grows locally, and has smaller, more bluntly tipped flowers. The colours also differ, pale, blue and brown. Clumps are usually of a single colour.

Page 5, with *Huperzia selago* (L.) Bernh. ex Schrank & Mart. (*Lycopodiaceae*): this plant has grains ['granula'] between its leaves.

Page 6, with *Thesium ebracteatum* Hayne (*Santalaceae*): plants near the town of Bringenz grow up to half a cubit [i.e., c. 25 cm] in height.

Page 6, with *Dianthus carthusianorum* L. (*Caryophyllaceae*), & page 8 and 3, with *Origanum vulgare* L. (*Lamiaceae*): collected near the gallows. Both plants grow 'in herbs' [i.e., a herbaceous vegetation] between shrubs.

Page 8, with *Epilobium angustifolium* L. (*Onagraceae*): a white-flowered form, which is rarely found.

Page 15, with *Pyrola chlorantha* Sw. (*Ericaceae*): found in ravines ['spelunca'] where 'Calceolus mar.' [*C. marianus* Mill.*?* = *Cypripedium calceolus* L. (*Orchidaceae*)] grows, and also found in the woods at Jasken.

Page 20, with *Calocera viscosa* (Pers.) Fr. (*Dacrymycetaceae*) or *Clavulinopsis corniculata* (Schaeff.) Corner (*Clavariaceae*): this Manninol is found in three colours: No. 1, which is this one, is yellow, No. 2 is grey and No. 3 is white [possibly three different species].

Page 23 and page 12, with *Chaerophyllum hirsutum* L. (*Apiaceae*): a nicely aromatic plant.

Page 25, with *Eriophorum vaginatum* L. (*Cyperaceae*): should know that it is not *Linum pratense*.

Unnumbered sheet (after page 27), with the name *Pulsatilla ranunculi folio obtusiore*: added this year [1659]. Flowers are blue and fragrant. Flowers in the mountains around Thorunia [Torún, central Poland], and was sent to me by Jacobus Hase, under the name *Pulsatilla caerulea odoratissima*. Also found in the heather at Beren.

Idem, with the name *Lichen petrae*…: found laden with its circles [covered in fruiting bodies?].

Idem, with the name *Pulsatilla flore clauso caeruleo*: Also found with black-brown flowers and one which is ash-grey with the front tips of the leaves [petals?] brown.

Page 4, with *Veronica officinalis* L. (*Plantaginaceae*): the flowers are white, but turn pink during drying.

Page 6, with *Vicia sylvatica* L. (*Fabaceae*): flowers elegantly striped, 'ut in Geranio Virgineum' [It is unknown what Breyne meant here. He possibly compared the striation of the flowers to a plant he called *Geranium Virgineum*, or the collected *Vicia* grew in amongst such a plant].

Unnumbered sheet (after page 6), above a removed plant: When still flowering and standing at its best, this *Nidus avis* has the same pale colour it has now, as root, stem, foliage and flower are of a single colour [this page possibly contained a specimen of *Neottia nidus-avis* L. (Rich.) (*Orchidaceae*)].

Page 11, next to removed plant and label: NB: this species with broader leaves Your Honour can see with Sr. Hermanus van den Burch [An as of yet unknown contact of Breyne's] .

Page 12, next to removed plant and label: NB: this species with narrow leaves Your Honour can see with my Cos. [cousin] Johan Breynne. [Jacob Breyne's cousin Johannes Breyne].

Remarks from the 1673 herbarium:

Page 67, with *Rhododendron tomentosum* Harmaja (*Ericaceae*): 'cum fructibus' [i.e., in fruit].

Page 69, with *Geum rivale* L. (*Rosaceae*): a double-flowered form.

Page 48, with *Astragalus arenarius* L. (*Fabaceae*): rare in Austria according to Clusius. It is common in sandy locations in Cassubia.

Page 55, with *Anthoxanthum nitens* (Weber) Y.Schouten & Veldkamp (*Poaceae*): the illustration as provided by Caspar and Johannis Bauhin is not very informative. The plant has variable glumes. It is collected only in the mountains, and is often found in Prussia. In spring, bunches of the plant [its rhizomes?] are harvested because of their fragrance and given to young ladies.

Page 24, with *Helichrysum arenarium* (L.) Moench (*Asteraceae*): the colour of the plant is between the lemon-yellow of the previous and the fire-colour [orange] of the following plant.

Page 33, with *Antennaria dioica* (L.) Gaertn. (*Asteraceae*): Caspar Bauhin described it as 'Gnaphalium with long flowers and narrow leaves', but his brother Johannis thought there to be nothing special about the leaves, while the flowers are short or long, as confirmed.

Page 44, with *Centaurea stoebe* L. (*Asteraceae*): varies between locations, Clusius distinguishes a short and a tall species.

Appendix 5 Plants mentioned in Breyne's *Centuria* and/or Reyger's *Tentamen* *.

Current identification	Family	Mentioned in *Centuria*	Mentioned in *Tentamen*
Alyssum alyssoides (L.) L.	*Brassicaceae*		×
Antennaria dioica (L.) Gaertn.	*Asteraceae*		×
Avenella flexuosa (L.) Drejer	*Poaceae*		~
Buphthalmum salicifolium L.	*Asteraceae*		~
Bupleurum longifolium L.	*Apiaceae*		×
Chaerophyllum hirsutum L.	*Apiaceae*		~
Cornus sanguinea L.	*Cornaceae*		×
Echium vulgare L.	*Boraginaceae*		~
(*Gentiana cruciata* L.)	*Gentianaceae*		×
Geum rivale L. (double-flowered form)	*Rosaceae*	×	×
Hypochaeris maculata L.	*Asteraceae*		~
(*Lycopodiaceae* sp./spp.)	*Lycopodiaceae*		×
Nardus stricta L.	*Poaceae*		~
(*Neottia nidus-avis* (L.) Rich.)	*Orchidaceae*		×
Phyteuma spicatum L.	*Campanulaceae*		×
Pyrola rotundifolia L.	*Ericaceae*		×
Rhododendron tomentosum Harmaja	*Ericaceae*		×
Scorzonera humilis L.	*Asteraceae*		×
Teucrium fruticans L.	*Lamiaceae*		~
Thalictrum lucidum L.	*Ranunculaceae*		×
Vaccinium uliginosum L.	*Ericaceae*		×
Vicia sylvatica L.	*Fabaceae*		×
Viscum album L.	*Santalaceae*		×

* This table lists the plants found in the combined Leiden Breyne herbaria which are listed in Breyne's *Centuria* (Breyne 1674–1678) and/or Gottfried Reyger's *Tentamen* (Reyger 1764). No plants from the herbaria were mentioned in Breyne's *Prodromus* (Breyne 1680–1689).
(× = name by Breyne matches with name in work; ~ = name by Breyne matches partially with name in work, description points to the same or a very similar species. Names between brackets indicate tentative identifications).