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Picturing Nature: Gender and the Politics of Natural-Historical Description in Eighteenth-Century Gdańsk/Danzig

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Abstract: The concept of 'description' has increasingly come under scrutiny in the history of science. This paper explores eighteenth-century debates over description through the case study of a scientific family in Gdańsk (the former Danzig). There, on the shores of the Baltic, physician Johann Philipp Breyne took Latin notes on naturalia, while several of his daughters drew and painted vivid representations of them 'from life' and one daughter wrote 'poetical descriptions' of them. In the Breyne family's work, different forms of description of the natural world were juxtaposed to reveal what might be termed a gendered politics of description.

Keywords: natural history, exotic species, gender, illustration, early Enlightenment, Danzig, Gdańsk, Royal Prussia, Poland

Over the course of the past several decades historians of science have begun to pay increasing attention to concepts such as 'experiment' and 'observation' and the key role they played in the emergence of distinctively modern forms of natural knowledge.[1] One such concept, which has increasingly come under scrutiny, is that of 'description'.[2] As historians of science have explored the ways in which enquirers into nature described the species and phenomena they encountered – from exotic plants to electrical shocks – it has become more and more obvious that, during the eighteenth century in particular, numerous modes of description competed with each other for favour. What was the best way to set down a meaningful description of, say, a fossil? Would it be to write a lengthy account of its features? If so, should the account be in Latin or the vernacular? And should the description attempt to include every feature visible with the naked eye (or the microscope), or only some? Might a visual representation, say a drawing or a painting, perhaps provide a more accurate form of description? These are some of the issues that enquirers after natural knowledge faced during the eighteenth century, as they attempted to cope with a proliferation of natural objects to be described.

This paper will explore eighteenth-century practices of description through the case study of one particular scientific family in Gdańsk (the former Danzig) in what is now Poland, but was at the time considered (by German-speakers, at least) to belong to Royal Prussia as well.[3] There, on the shores of the Baltic, the physician Johann Philipp Breyne (1680-1764) cultivated a flourishing garden of botanical rarities, well supplied with new seeds as well as a whole range of other kinds of specimens thanks to his voluminous correspondence with naturalists elsewhere.[4] As was typical of learned naturalists at the time, Breyne devoted large portions of his published writings to extensive Latin descriptions of the naturalia that came his way. He was thus, like other writers on plants, animals, minerals, and such natural kinds, deeply involved in the project of description.

Johann Philipp Breyne was not the only person in his household, however, who may be said to have 'described' the natural objects mentioned above. One of his daughters, Anna

Renata Breyne (1713-1759), wrote poems celebrating the flowering of exotic species, such as pineapple and banana plants, cultivated in her father's garden. Anna Renata's sisters Johanna Henrietta (1714-1797) and Constantia Philippina (b. 1708) were also paying close attention to nature, as they drew and painted vivid representations of numerous specimens 'from life'.[5] Johann Philipp Breyne seems to have found at least some of these depictions of scientific value, in that he had a skilled engraver prepare engravings of them to be included in at least one published treatise.

This paper will explore the ways in which, in this case as in many others, different forms of description of the natural world coexisted side by side during the eighteenth century, exhibiting a gendered politics of description. As an examination of the Breyne family's involvement in descriptive practices reveals, family members seem to have occupied themselves with the representation of the natural forms they observed in ways that reflected contemporary concerns with scholarly status as well as social propriety. The daughters of Johann Philipp Breyne demonstrated, in many ways, an interest every bit as keen as that of their father in the tropical plants he grew in his garden and the assorted fossil and other specimens that came his way. And they expressed this common interest through their poems, drawings and paintings. Yet as the diverse trajectories of the family's various descriptive efforts suggest, gendered understandings of these efforts shaped the degree to which they either remained in close familial circles or were exposed, through print publication, to broader audiences. As the paper will show, the description of nature was in many ways a family project for the Breynes. The way in which this family project was carried out was significantly gendered, as was, ultimately, the production of natural knowledge itself.

I. Describing Nature

Nowhere were issues of description more prominent than in the study of natural history. Sometimes defined as the study of the three ancient kingdoms of animal, vegetable and mineral, natural history in the eighteenth century was in fact often viewed as comprising the study of an even broader range of natural phenomena, from the weather to anything strange or unusual, as long as it seemed to be natural in origin. Nor was the breadth of the field confined to the variety of its objects; Enlightenment natural history spanned the globe in the dazzling multiplicity of these objects' areas of origin. Ships criss-crossed the oceans and brought back specimens, or depictions of them, from the Americas, Africa, Asia and (by the end of the century) numerous Pacific islands as well.[6] Meanwhile, the European continent, where so many of these transoceanic voyages originated, was itself canvassed with increasing intensity in a quest to take an inventory of nature's productions more fully than ever before.[7]

To the diversity of objects and sites of natural history must be added at least one more form of diversity: that of practices of description. Those intrigued by the study of nature's productions grappled with the question of how best to record their observations of nature. At the most basic level this resulted in the production of lists, a vast number of which survive from the eighteenth century in both printed and manuscript form. Lists were only effective means of communication, though, in those cases where the words on the list meant exactly the same thing to both writer and reader. And for the first half of the eighteenth century, in particular, this was seldom the case. Debates over what Latin names to use to refer to specific specimens had long formed a staple of natural-historical discourse, with these Latin names themselves frequently representing forms of description.

Well into the eighteenth century, for example, plants were commonly referred to by Latin names of five or six words, in the form of a noun followed by multiple adjectives, with each adjective representing what some naturalist at some point had seen as a key attribute of the specific plant in question. A plant's name, in other words, *described* as well as identified that plant.

Even after the renowned Swedish naturalist Carolus Linnaeus, midway through the century, set forth his own Latin system of binomial nomenclature – which legislated a sharp reduction in the number of words in an organism's name to two, and which was by no means immediately accepted across the globe or even Europe – verbal description continued to represent a vital part of the naturalist's task. Every species, even if now Linnaean and thus usually non-descriptive in name, still needed at least one full verbal description – a 'picture in words', as it were – of what made it special, what identified it and differentiated it from other species. These descriptions had traditionally been, like plant names, composed in Latin, the *lingua franca* of learned discourse in Europe, and the practice continued throughout the eighteenth century, under the new Linnaean order.[8] Until a species had been 'published' – that is, until its verbal description had appeared in print – it was not regarded by naturalists as known, as comprising a part of the common store of natural-historical knowledge.[9] Nor could proper credit be given to the person who had brought the existence of the species to the awareness of the learned community. Thus written descriptions in Latin continued to proliferate throughout the eighteenth century.

In the wider culture outside the universities and the pan-European Republic of Letters, though, Latin was no longer the pre-eminent language of publication. Continuing a pattern that had begun much earlier in medieval Europe, and which had gained intensity in the early modern period, the vernacular came increasingly to be used as a medium of written communication. This complicated issues of description in natural history. More and more, university-educated naturalists came to publish works both in Latin and in the vernacular, as they sought to reach a broader range of audiences. For not only the university-educated, of course, found knowledge about the animal, vegetable and mineral worlds of great interest in an age of utility and of commerce. Thus the English physician and collector Hans Sloane, for example, wrote both a Latin local flora and a very different, much lengthier, English version in expansive prose describing the natural productions of Jamaica and other Caribbean islands he had visited.[10] Many authors, such as the famous French naturalist Buffon, wrote natural-historical works solely in the vernacular, enabling that vast majority of the population in Europe and the colonies who read no Latin to take part in the fashion for natural history.[11] Many of these vernacular works were written in a style quite similar to that of Latin works, as alphabetised catalogues of species with a strong emphasis, in each entry, on naming and physical description, often accompanied by discussions of a species's uses, habitat and patterns of seasonal change. Even despite these structural similarities, though, vernacular descriptions were generally not regarded by learned naturalists as properly precise and authoritative.[12] Other vernacular works, meanwhile, left the realm of prose entirely, as didactic versifiers praised the natural world in all of its three kingdoms.[13] Even these poetical productions, however, still had much of the descriptive in them. In the course of praising both nature and her Creator, verses carefully directed attention to the different parts of the natural objects they described.[14]

Words, however, as naturalists increasingly realised, might not suffice as a means of description for nature's varied forms. As far back as the ancient period, authors had attempted to supplement their descriptions of the natural world with illustrations that might aid understanding – what might be termed visual descriptions. As the Roman author Pliny the Elder pointed out in his influential *Natural History*, though, the difficulty

of accurately hand-copying images of natural objects posed a formidable challenge to the use of visual descriptions.[15] Over a millennium later, the advent in the fifteenth century of processes for printing woodcuts led eventually to a new surge of enthusiasm, in sixteenth-century printed herbals and other natural-historical works, for printing images depicting specimens alongside their verbal descriptions. Often these images had originally been drawn 'from life', though this was not always the case.[16] Throughout the early modern period and on into the eighteenth century, visual depictions of naturalia continued to be extremely important. Publications of written descriptions of species were frequently accompanied, if finances permitted, by detailed copper-plate engravings of the species in question, replacing earlier woodcuts. Numerous drawings and paintings were created, furthermore, without any intent of publication; in the eighteenth century, in particular, many admirers of natural history enjoyed the activity of image-making both in itself and for the opportunities it offered for exchange with other enthusiasts.

These different forms of description, though – whether Latin or vernacular, poetic or prosaic, verbal or visual – were gendered in complex ways. Both men and women participated actively in many of the practices of eighteenth-century natural history, but not equally. Like many other forms of natural knowledge, natural history was carried out to a great degree in household settings, which increased women's participation.[17] But women during the eighteenth century were usually taught only in the vernacular: Latin learning was generally seen as suitable only for boys, who could enter the all-male preserve of the university. It was therefore exceedingly rare for a woman to have learned how to pen authoritative Latin-language species descriptions.[18] *Visual* description of specimens, on the other hand, was another matter. While drawing and painting were frequently taught in male-only crafts guilds, they were also, in marked contrast to Latin, seen as eminently suitable skills for young ladies as well as young men to acquire. Both boys and girls from families of sufficient means often received instruction in these arts in a household setting.[19] It is for this reason that much of what we know about women's participation in natural history, especially in the period prior to the 1780s, concerns women who drew or painted specimens, such as Maria Sibylla Merian, Anne Lister, Madeleine Basseport, Elizabeth Blackwell and Jane Colden, to name just a few.[20] The descriptive efforts of eighteenth-century women, ill trained to tackle the challenge of Latin verbal description, often took visual rather than verbal form.

II. Fathers, Sons and the Shaping of a Family Tradition

Johann Philipp Breyne had, in many ways, been brought up from an early age to interest himself in natural history. His father, Jakob Breyne, the first known family member to display an enthusiasm for natural history, had been a merchant by training who, during an early apprenticeship in the Netherlands, had happened to acquire a very strong passion for botany and for the description of exotic plants in particular. After getting married and setting himself up in Danzig as a young householder, he had proceeded to make use of his Dutch botanical connections to publish several lavish volumes on exotic plants.[21] Simultaneously, he seems to have taken care to pass down his mercantile skills to one of his sons, and his botanical skills to his other son, Johann Philipp, as we know from his records of their local botanical expeditions and of the specimens Johann Philipp collected from the age of twelve.[22]

After the elder Breyne's death in his forties, this latter son, Johann Philipp, then followed in his father's footsteps by travelling to the Netherlands to complete his own education. At

Leiden he wrote several dissertations on botanical topics, eventually obtaining a medical degree that would enable him to earn a living while remaining active in natural-historical affairs.[23] After being awarded his degree, and travelling for several years around Europe in order to meet physicians and naturalists around the Continent, Johann Philipp returned to Danzig and set up his own household. There, while practising medicine, he was to continue his father's legacy in many ways, for example by preserving and expanding his father's extensive collection of botanical books, his herbarium and even his correspondence network with botanical luminaries across Europe, adopting and cultivating each of these as his own.

One of his father's legacies, which Johann Philipp continued, was that of natural-historical description. Throughout his long career the Latin description of natural objects formed an important part of his work, as it had been for his father. This can be seen in several ways. First, numerous Latin descriptions survive in manuscript form as part of the family papers.[24] Second, his own publications contained numerous lengthy descriptions, all in Latin, of the relevant specimens he had observed, ranging from exotic plants to fossils. Such finely crafted descriptions had, of course, been essential to the initial publication of his 'botanico-medical' dissertations in Leiden, and their continued production remained essential to his remaining an active member of the community of learned naturalists.

One can safely assume that Johann Philipp might well have hoped to pass down his love of natural history, and his involvement in natural-historical description, to his own two sons, Johann Heinrich and Philipp Jakob. However, both unfortunately died young: Philipp Jakob at eleven years of age in 1733, followed by his older brother Johann Heinrich, by then a university student in Marburg, in the course of a visit to London in 1740.[25] In any case, the latter had, several years before his untimely death, chosen to study law rather than medicine.[26] So any further continuation of the family's natural-historical interests was impossible, on the male side of the family at least.

III. Picturing Nature through 'Poetical Description'

Johann Philipp was far from the only member of the Breyne household to interest himself in natural history, or in issues of description. One of his daughters, Anna Renata, wrote what is nowadays generally referred to as 'occasional poetry': that is, poems penned to commemorate special events within a person's life or the life of that person's community more broadly. Although she did not publish these poems, they survive in a neatly penned manuscript version, perhaps intended as a presentation copy, suggesting that she may perhaps have circulated them among a small circle of friends.[27] Through these verses, written in German, we have a record not only of weddings and funerals within the Breyne family but also of Anna Renata's musings on the occasion of the successful blooming and/or production of fruit of several of the exotic plants her father had cultivated in his garden.[28] In these poems, though they represent a form of writing few then or now would deem to be 'scientific', Anna Renata can be seen as expressing an interest in description comparable in many ways to that of her father and other university-trained naturalists.

This interest in description stands out even in the titles of several of Anna Renata's poems. Among the verses she wrote on the natural world were several that she, in fact, explicitly labelled in their titles as consisting of 'description'. For example, she titled one lengthy composition of eighty-four lines, written on one of the several occasions on which her father succeeded in getting pineapples to grow in Danzig, a 'Poetical Description of the

Noble Pineapple'.[29] In this poem, dated 1733, as in her other verses dealing with nature, several themes emerge. Another piece makes an appeal to the emotions in a manner characteristic of contemporary German nature poetry.[30] Anna Renata presents her experience of encountering the pineapple plant with its fruit as one touching the 'heart'.[31] Again and again she conveys a sense of a strong emotional reaction to the experience through adjectives containing the root word 'wonder'.[32] Related to this is a strong emphasis on the senses. She portrays the pineapple plant as appealing not only to the 'eye', to a visual sense of beauty, but also (through its highly pleasant scent) to the 'nose' and (through the delicious taste of the fruit) to the 'mouth' as well.[33] She concludes this, as well as her other poems on the natural world, by invoking natural theology in a way characteristic of the time: the pineapple plant is so beautiful, she declares, that it directs our hearts to give thanks to its Creator.[34]

Yet there is more to Anna Renata's poetry than mere praise of natural beauty (or even religious sentiment). Her verses show that she has paid considerable effort to the verbal description of the physical features of plants, flowers and fruits. In the case of the pineapple plant, for example, Anna Renata systematically discusses each part of the plant in turn, from the fruit itself to the characteristics of surrounding leaves and stems.[35] The description is, of course, qualitative, not quantitative. Like other writers of nature poetry at the time, but unlike those in subsequent decades who, following the Linnaean system, were able to achieve a certain amount of precision by avidly counting stamens and pistils, Anna Renata does not count anything. Translated into English and shorn of their rhyme scheme, individual couplets seem unimpressive: 'On the outside [of the fruit] there are many small sharp points; with these, [Nature], armed and equipped, protects the fruit like a queen.'[36] Nonetheless, here, as in the many other descriptive passages in this and Anna Renata's other nature poems, she does supply considerable detail about the individual parts of the plants she describes.

It is worth noting, however, that Anna Renata repeatedly in her verses downplays her (and their) descriptive abilities. Several of her nature poems contain passages in which she claims an inability to praise a specific natural object sufficiently. In her poem on the pineapple, for example, dramatically addressing the plant itself for effect, Anna Renata asserts that 'I indeed cannot sing about you according to your worth'.[37] And in a relatively brief poem titled 'On Viewing the Fruit-Bearing Banana Plant', commemorating another of her father's hothouse triumphs, all eight lines are employed in service of her complaint that she is not able properly to 'sing about' the banana plant's 'size, stem and leaves, flower and fruits'.[38] Poetic convention can, of course, quite easily account for lines such as these; gestures towards ineffability are a time-honoured literary trope, and a certain degree of authorial modesty was generally expected during the eighteenth century. However, it also seems possible that some degree of actual modesty or humility may have been implied. Whether this modesty was linked to gender or merely a reflection of a more common eighteenth-century trope of authorial reluctance, shared by male and female authors of the time alike, is, of course, impossible to say.[39] But Anna Renata Breyne's vernacular poetic descriptions of plants serve as a fascinating counterpart to her father's descriptions of them, in Latin prose, in large part because of the very different registers of each form of description.

IV. 'Painted According to Life'

Verbal description aside, there was, however, yet another way in which Anna Renata, along with two of her sisters, could end up contributing to what was ultimately a family-

wide involvement with the description of nature. This was through visual depiction. Johann Philipp clearly valued images of natural objects, and hired trained artists to draw or paint his specimens, among them the Danzig-based painter Daniel Schultz.[40] But these artists were not the only ones to produce drawings or paintings in the Breyne household. For at least three of Johann Philipp's daughters – Anna Renata, Johanna Henrietta and Constantia Philippina – had obviously also been taught, at some point, to draw and paint. And they applied these skills to the natural items in which their father was especially interested, producing hundreds of drawings and paintings of rare species.

Although most of the images produced by and/or for the Breyne family bear no signs as to their authorship, almost a hundred of them do. Many of these images contain tiny monograms or interlinked sets of initials forming symbols; these monograms, usually placed at the bottom of the page on which an image was drawn or painted, were used by each of the Breyne sisters as a form of signature. Based on these monograms, it is possible to identify some of the topics favoured by each sister. Anna Renata, for example, seems to have produced the majority of those botanical paintings whose authorship is known.[41] Her younger sister Johanna Henrietta, just a year below her in age, seems to have preferred to limn fishes and other sea creatures; she was the one responsible for a striking image of a stranded whale, for example.[42] Constantia Philippina, the oldest sister, seems to have been responsible for fewer images than either of her younger sisters; her monogram is to be found on various paintings of birds, although Anna Renata painted more birds over all.[43] Many images remain of unknown authorship, though; for example, there are no monograms or other forms of signature on the array of paintings of banana plants and their fruit, presumably produced around the same time that Johann Philipp had finally succeeded in getting them to grow in his hothouse.[44]

Many of the paintings and drawings survive without any accompanying description or commentary, let alone any evidence as to their possible circulation outside of the Breyne household. There is one case, though, in which Johann Philipp did indeed comment on the fact that a daughter of his had produced a particular image. The image in question was a painting of an African aloe plant. Anna Renata's monogram appears not just once but twice on the painting: first, in pencil, on the bottom right-hand corner of the page, and second, in black ink, within the brownish soil from which she portrays the plant as growing.[45] Her role in the creation of this painting is confirmed by a slip of paper that her father wrote describing the image. On this slip of paper Johann Philipp first wrote a lengthy Latin descriptive name of the plant, followed by a citation of a page in a book by a Dutch author. Then, before moving on to further Latin description of the plant's appearance, he adds: 'It flowered in my garden in August in 1733, and my daughter Renata painted it according to life.'[46]

This is one of the only instances, throughout all of his manuscript notes, in which Johann Philipp discussed the attribution of an image, and it suggests some of the ways in which natural-historical description seems to have been shared within the context of daily life in his household. Here we get a glimpse of a situation in which Johann Philipp generated Latin verbal descriptions of natural objects – all the surviving Latin descriptions accompanying images are in his hand – while his daughters and hired artists produced what might be termed their visual descriptions, the images naturalists at the time considered so essential to the proper understanding of the natural world.[47] The way in which these various natural-historical activities were shared in the Breyne household shows some similarities with arrangements at the time in which tasks in households were divided up according to gender as well as other forms of status and rank.[48] Such arrangements, of course, were not always rigid but might vary according to the situation. They did, however,

form patterns that shaped the production of goods and services. In the case of the Breyne family these kinds of pattern seem to have shaped the production not so much of goods and services as of natural knowledge itself, as acquired through the activity of description.

Some of the significance of this gendered division of labour can be seen when we look at how images produced in the Breyne household were actually incorporated into Johann Philipp's published works, those markers of scholarly status in which learned naturalists at the time took such pride. In the formal treatises Johann Philipp issued from Danzig every few years on assorted naturalia, he often arranged to complement his Latin descriptive text with images. And in at least one case a daughter seems to have played a crucial role in generating these images. The case in question is that of the images that appeared in the form of engravings in one of Johann Philipp's treatises, *Dissertatio physica de polythalamiis*, on the topic of fossilised molluscs. The original drawings from which the engravings were produced survive, and several of them are clearly labelled with Johanna Henrietta's monogram.[49] In the process of her drawings being converted into engravings, though, any credit or acknowledgment of her role in producing the originals disappeared. In the lower right-hand corner of each engraving, the name of the engraver (in this case, male) has replaced the monogram of the artist (in this case, female).[50] In other words, the process of publishing the images – of bringing them to the public attention of naturalists elsewhere – seems to have resulted in the elision, across lines of gender difference, of Johanna Henrietta's own role in the labour of description: a role that had in fact made this particular form of visual description possible.

Reasons abound, of course, that might suffice to explain why Johanna Henrietta never received any individual public credit for her labours of visual description. Perhaps the most important of these relates to the unspoken ground rules that shaped gendered social conventions in the mid-eighteenth century. According to these conventions, which varied from place to place within Europe yet showed common patterns throughout the Continent, it would simply have been seen as socially inappropriate for a woman in her circumstances to claim this kind of distinction in the public realm. To do so might potentially have infringed on her father's standing as a learned naturalist: like other Enlightenment scholars, Johann Philipp Breyne was accustomed to drawing on the efforts of numerous others, whether paid or unpaid, in the exercise of scholarship.[51] More simply, in the family project of natural history, as in other family enterprises at the time, recognition of individual efforts seems frequently to have been seen as less important than the achievement of broader family goals. For learned naturalists, the act of producing public descriptions of the natural world seems ultimately to have mattered more than the question of which specific individuals contributed to this larger project.[52]

As this paper has shown, many different ways of describing the natural world coexisted in the eighteenth century, from Latin scientific description to vernacular poetry and visual depiction. The Breyne family members, from Johann Philipp to Anna Renata and her sisters, were engaged in all of these options. Each mode of description seems to have offered opportunities for understanding the natural world in a slightly different way, whether by focusing on physical features, evoking non-visual senses or the emotions or engaging in the immediacy of visual perception. Questions of social convention as well as access to the tools of each kind of description gendered – and thus complicated – the ways in which these modes of description could be brought together: for example, in the form of a published work weaving together the visual and the verbal. Ultimately, in the case of the Breynes at least, the very process of trying, through publication, to unite the natural knowledge created through diverse modes of description was one that seems to have hidden the gendered nature of its own production.

The Linnaean system created a standardised system of nomenclature that became gradually accepted by Europeans during the latter half of the eighteenth century. Nevertheless, accompanying practices of natural-historical description, both visual and verbal, continued to flourish. The bulk of the evidence, furthermore, suggests that many of these practices continued to be seen in gendered ways, even as more and more women came to be recorded as showing an active interest in natural history.[53] Indeed, these gendered aspects of natural history multiplied and became even more obvious as botany came to be known as a 'feminine science'.[54] Further attention to these nuances of gender, across a range of geographical contexts, may help us understand better what it meant to describe the natural world in the eighteenth century.

NOTES

1. See, for example, David Gooding, Trevor Pinch and Simon Schaffer (eds), *The Uses of Experiment: Studies in the Natural Sciences* (Cambridge: Cambridge University Press, 1989), and Lorraine Daston and Elizabeth Lunbeck (eds), *Histories of Scientific Observation* (Chicago, IL: University of Chicago Press, 2011).

2. Here I would like to acknowledge a number of fascinating studies over the past few decades that have wrestled with issues of visual and verbal description. See, for example, Svetlana Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century* (Chicago, IL: University of Chicago Press, 1983), and Brian W. Ogilvie, *The Science of Describing: Natural History in Renaissance Europe* (Chicago, IL: University of Chicago Press, 2006). See also: John Bender and Michael Marrinan (eds), *Regimes of Description: In the Archive of the Eighteenth Century* (Stanford, CA: Stanford University Press, 2005); Cynthia Wall, *The Prose of Things: Transformations of Description in the Eighteenth Century* (Chicago, IL: University of Chicago Press, 2006); and Joanna Stalnaker, *The Unfinished Enlightenment: Description in the Age of the Encyclopedia* (Ithaca, NY: Cornell University Press, 2010).

3. On this complex situation, see Karin Friedrich, *The Other Prussia: Royal Prussia, Poland and Liberty, 1569-1772* (Cambridge: Cambridge University Press, 2000).

4. For a brief biography of Johann Philipp Breyne, as well as his father, see Helmut Roob and Cornelia Hopf, *Jacob und Johann Philipp Breyne: zwei danziger Botaniker im 17. und 18. Jahrhundert. Nachlaßverzeichnis* (Gotha: Forschungsbibliothek Gotha, 1988), p.9-15. A much fuller discussion of the two, focusing on their publication practices, can be found in Alicja Kurkowa, *Jakub i Jan Filip Breynowie: studium z dziejów kultury książki XVII i XVIII wieku* (Wrocław: Zaklad Narodowy imienia Ossolińskich Wydawnictwo Pólskiej Akademii Nauk, 1989).

5. On the Breyne daughters, see Roob and Hopf, *Jacob und Johann Philipp Breyne*, p.14-15.

6. On the geographical reach of eighteenth-century natural history, see: Londa Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World* (Cambridge, MA: Harvard University Press, 2004); Harold J. Cook, *Matters of Exchange: Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven, CT: Yale University Press, 2007); Richard Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* (New Haven, CT: Yale University Press, 2000); David Philip Miller and Peter Hanns Reill (eds), *Visions of Empire: Voyages, Botany, and Representations of Nature* (Cambridge: Cambridge University Press, 1996); and Londa Schiebinger and Claudia Swan (eds), *Colonial Botany: Science, Commerce, and Politics in the Early Modern World* (Philadelphia, PA: University of Pennsylvania Press, 2005).

7. Alix Cooper, *Inventing the Indigenous: Local Knowledge and Natural History in Early Modern Europe* (Cambridge: Cambridge University Press, 2007).

8. Indeed, the practice survives even to the present day, even though Latin is no longer required as the language of description.

9. William T. Stearn, *Botanical Latin*, 4th edn (Portland, OR: Timber Press, 2004), p.154-5.

10. Sloane was, of course, born in Northern Ireland; the use of the term 'English' to describe him here refers to his decision to spend most of his career in London. In terms of his publications, Sloane's first book, mentioned above, was his *Catalogus plantarum quae in insula Jamaica sponte proveniunt, vel vulgò coluntur, cum earundem synonymis & locis natalibus; adjectis aliis quibusdam quae in insulis Maderae, Barbados, Nieves, et Sancti Christophori nascuntur. Seu Prodromi historiae naturalis Jamaica pars prima* (London: D. Brown, 1696). This was obviously in Latin and aimed at a more learned audience of naturalists. His second book on his travels, for a broader public, was his *A Voyage to the Islands Madera, Barbados, Nieves, S. Christophers and Jamaica, with the Natural History of the Herbs and Trees, Four-Footed Beasts, Fishes, Birds, Insects, Reptiles, &c. of the Last of those Islands; To which is prefix'd An Introduction, Wherein is an Account of the Inhabitants, Air, Waters, Diseases, Trade, &c. of that Place, with some Relations concerning the Neighbouring Continent, and Islands of America*, 2 vols (London, 1707-25).

11. On Buffon, see Jacques Roger, *Buffon: A Life in Natural History*, trans. Sarah Lucille Bonnefoi, ed. L. Pearce Williams (Ithaca, NY: Cornell University Press, 1997).

12. Stearn, *Botanical Latin*.

13. On the poetic works of such well-known writers as James Thomson and Erasmus Darwin, among others, see Elizabeth Sewell, *The Orphic Voice: Poetry and Natural History* (New Haven, CT: Yale University Press, 1960),

and M. M. Mahood, *The Poet as Botanist* (Cambridge: Cambridge University Press, 2008). As recent work has shown, revivals of georgic and pastoral modes helped further the prominence of natural themes in poetry. See Kevis Goodman, *Georgic Modernity and British Romanticisim: Poetry and the Mediation of History* (Cambridge: Cambridge University Press, 2004). In the German context, see Walter Schatzberg, *Scientific Themes in the Popular Literature and the Poetry of the German Enlightenment, 1720-1760* (Bern: Herbert Lang, 1973), p.133-308.

14. Here see, in particular, John Arthos, *The Language of Natural Description in Eighteenth-Century Poetry* (New York: Octagon, 1970).

15. '[T]he diversity of copyists from the original paintings, and their comparative degrees of skill, add very considerably to the chances of losing the necessary degree of resemblance to the originals [...] Hence it is that other writers have confined themselves to a verbal description.' Pliny, *Natural History*, Chapter 4, Book 25, and Chapter 5, Book 25, as quoted in William M. Ivins, Jr, *Prints and Visual Communication* (Cambridge, MA: The MIT Press, 1969), p.14.

16. Ivins, *Prints and Visual Communication*, p.33-6 and 40-46.

17. On such settings, see Alix Cooper, 'Homes and Households', in Katharine Park and Lorraine Daston (eds), *The Cambridge History of Science*, vol. 3 *Early Modern Science* (Cambridge: Cambridge University Press, 2006), p.224-37.

18. During the second half of the century, and particularly from the 1780s, this situation began to change as writings about the Linnaean system popularised botanical involvement for women. See Ann B. Shteir, *Cultivating Women, Cultivating Science: Flora's Daughters and Botany in England, 1760 to 1860* (Baltimore, MD: Johns Hopkins University Press, 1996). Still, this popularisation took place mainly in the vernacular.

19. Ann Sutherland Harris and Linda Nochlin, *Women Artists: 1550-1950* (New York: Knopf, 1984), p.38; Ann Bermingham, *Learning to Draw: Studies in the Cultural History of a Polite and Useful Art* (New Haven, CT: Yale University Press, 2000), p.78.

20. See, for example: Londa Schiebinger, *The Mind Has No Sex? Women in the Origins of Modern Science* (Cambridge, MA: Harvard University Press, 1989), p.68-79; J. D. Woodley, 'Anne Lister, Illustrator of Martin Lister's *Historiae Conchyliorum*', *Archives of Natural History* 21 (1994): p.225-9; Kärin Nickelsen, *Draughtsmen, Botanists and Nature: The Construction of Eighteenth-Century Botanical Illustrations* (Dordrecht: Springer, 2010), p.115; Lucia Tongiorgi Tomasi, ' "La femminil pazienza": Women Painters and Natural History in the Seventeenth and Early Eighteenth Centuries', in Therese O'Malley and Amy R. W. Meyers (eds), *The Art of Natural History: Illustrated Treatises and Botanical Paintings, 1400-1850* (Washington, DC: National Gallery of Art, 2008), p.159-85; and Shteir, *Cultivating Women*, p.39-46 and 52-3.

21. For the sake of simplicity, and because German (both High and Low) seems to have been the vernacular of choice for the Breyne family, the German place-name 'Danzig' will be used throughout the remainder of this article rather than the bilingual 'Gdańsk/Danzig'.

22. Forschungsbibliothek Gotha, Chart. A 788, fol. 47-8 (henceforth the phrase 'Forschungsbibliothek Gotha' will be omitted); Roob and Hopf, *Jacob und Johann Philipp Breyne*, p.10.

23. Many practitioners of natural history during the eighteenth century were trained physicians, following in a long tradition in which natural history teaching at universities had been primarily lodged in medical faculties; physicians were expected to be familiar enough with plants and other naturalia to be able to supervise apothecaries' production of medicaments. See Harold J. Cook, 'Physick and Natural History in Seventeenth-Century England', in Peter Barker and Roger Ariew (eds), *Revolution and Continuity: Essays in the History and Philosophy of Early Modern Science* (Washington, DC: Catholic University of America Press, 1991), p.63-80.

24. Roob and Hopf, *Jacob und Johann Philipp Breyne, passim*.

25. Correspondence concerning the death of Johann Heinrich may be found in Chart. B787, fols 96r-100r and 667r-673r.

26. Breyne to Linnaeus, 23 Dec. 1739, 'The Linnaean Correspondence', http://linnaeus.c18.net.

27. Anna Renata Breyne, 'Kleine Samlung [*sic*] poetischer Einfälle bey müßigen Stunden verfertiget' (1748), Biblioteka Gdańska PAN (Polska Akademia Nauk), Gdańsk, MS 534.

28. On Johann Philipp's garden, see Zofia Schwarz, 'Prywatne ogrody botaniczne a rozwój nauk przyrodniczych w ośrodku gdańskim w XVI-XVIII wiekach', *Kwartalnik historii nauki i techniki* 31 (1986), p.411-44, especially p.435-7.

29. The full title is 'Poetische Beschreibung der edlen Ananas, welche uhrsprünglich aus der neuen Welt mit andern Schätzen, nach Africa, Asia und endlich auch in Europa gebracht worden, da sie dann auch seit einigen Jahren in Papa seinem Garten reichlich Früchte getragen. Anno 1733'. MS 534, fol. 71v.

30. Uwe-Karsten Ketelsen, *Die Naturpoesie der norddeutschen Frühaufklärung* (Stuttgart: Metzler, 1974).

31. MS 534, fol. 72v.

32. For example, 'wunderschön' and 'wunderbar' (fol. 71v), 'wundernswürdige' (fol. 72r), and 'wundernswehrt' (fol. 72v).

33. MS 534, fol. 72v. On the senses, see the recent AHR Forum on 'The Senses in History' in the *American Historical Review* 116:2 (April 2011), p.307-400, and the special issue on the senses in *Journal for Eighteenth-Century Studies* 35:4 (2012), p.465-564, guest-edited by Jonathan Reinarz and Leonard Schwarz.

34. MS 534, fol. 73r.

35. See especially fol. 72r and 72v.

36. MS 534, fol. 72v. This and all other translations from Anna Renata Breyne's manuscript are my own.

37. MS 534, fol. 71v.

38. MS 534, fol. 75v. Attempting to get tropical species to flourish in northern Europe was a common activity among naturalists at the time; see, for example, Carl Linnaeus, *Musa Cliffortiana: Clifford's Banana Plant*, trans. Stephen Freer, intro. Staffan Müller-Wille (Ruggell, Liechtenstein: A. R. G. Gantner Verlag, 2007).

39. Shteir, *Cultivating Women, Cultivating Science*. On elite expectations that 'amateurs' be suitably modest, see Anne Secord, 'Science in the Pub: Artisan Botanists in Early Nineteenth-Century Lancashire', *History of Science* 32 (1994), p.269-315, especially p.288-291, although of course this article discusses a slightly later period. See also Helen Cowie and Kathryn Grey, 'Nature, Nation and Nostalgia' (in this issue) for further discussion on modesty and the construction of (male) scholarly status. Many thanks also to Sarah Easterby-Smith and Emily Senior for a helpful discussion of this matter.

40. On Daniel Schultz, see W. Joost, 'Die Vogelbilder des Danziger Naturforschers Johann Philipp Breyne (1680-1764)', *Journal für Ornithologie* 108 (1967), p.300.

41. Chart. A782.

42. Chart. A 783a, fol. 26.

43. Chart. A 784.

44. See Chart. A782, fols 1r-9r.

45. Chart. A 782, fol. 49.

46. This note is labelled just 'Zu Bl. 49', one of several slips of paper that bear this designation.

47. It is, of course, quite possible that Johann Philipp himself may have produced some of the paintings that survive; however, I have not been able to locate any evidence that he did so, whereas clear evidence does exist for the production of paintings by his daughters as well as by the craftsmen he hired.

48. See, for example, Michael Mitterauer, 'Geschlechtsspezifische Arbeitsteilung in vorindustrieller Zeit', *Beiträge zur historischen Sozialkunde* 11 (1981), p.77-87.

49. Chart. B 810, fols 29 and 57.

50. Chart. B 810, fols 30 and 60. Engraving seems to have been an almost all-male trade, although a very few women do seem, given the right family circumstances, to have also learned this skill. The artist and naturalist Maria Sibylla Merian, for example, was taught engraving as a child in the family print shop, a skill she put to good use later in her life while publishing her researches on the flora and fauna of Suriname. Kim Todd, *Chrysalis: Maria Sibylla Merian and the Secrets of Metamorphosis* (New York: Harcourt, 2007), p.33.

51. Those women who were, unusually, publicly credited as natural-historical authors or illustrators (rather than, say, collectors) around this time tended to come from family situations where there was no father, brother or husband active as a naturalist: for example, in the case of Maria Sibylla Merian, famous for her Suriname researches and images, her father was dead by the time of their publication, and she had long since left her husband, as discussed in Ella Reitsma, *Maria Sibylla Merian and Daughters: Women of Art and Science* (Zwolle: Waanders, 2008). This kind of situation, however, seems to have been exceptional. Far more common was the kind of situation in the Breyne household, in which both daughters and hired artist/engravers may be seen as having shared the same basic status of 'invisible technicians', to use the phrase coined by Steven Shapin in his 'The Invisible Technician', *American Scientist* 77 (October 1989), p.554-63. The difference, of course, would be that those artists who were also engravers do seem to have been able to render themselves at least slightly visible by signing their name, albeit in tiny letters, at the bottom of the engravings in question.

52. Here see Daniel Margocsy, 'Commercial Visions: Trading with Representations of Nature in the Early Modern Netherlands', PhD diss., Harvard University, Cambridge, MA, 2009, Chapter 1.

53. Shteir, *Cultivating Women, Cultivating Science*.

54. Shteir, *Cultivating Women, Cultivating Science*; but see also Lisbet Koerner, 'Goethe's Botany: Lessons of a Feminine Science', *Isis* 84 (1993), p.470-95, and Lisbet Koerner, 'Women and Utility in Enlightenment Science', *Configurations* 2 (1995), p.233-55.

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