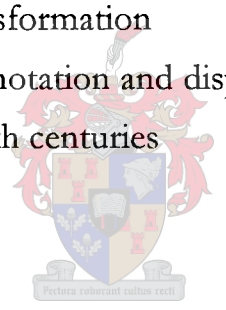
Opening the curiosity box:

Botanical images as sites of transformation for the scientific practices of annotation and display in the seventeenth and eighteenth centuries



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Thesis presented in partial fulfilment of the requirement for the degree of Masters of Philosophy, Visual Arts (Illustration) at Stellenbosch University

Supervisor: Professor Keith Dietrich

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Declaration:

I, the undersigned declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Date: 27 February 2007

Summary

This thesis investigates the hidden narratives of South African botanical images made in the late seventeenth to eighteenth century. Plant collecting and image making was part of early modernist scientific practice of collection and display. These images are examined from postmodern perspectives that treat them as "texts" that validated colonial botanical agendas. Botanical art objectified "nature" enforcing it into a textual code that sanitised it and made it suitable for study by Eurocentric natural philosophers.

The impact of particular scientific agendas about "nature" can be linked to the stereotyping and subjugation of both indigenous knowledge systems and women. This thesis considers the impact that the complex historical and socio-political situations of the seventeenth and eighteenth centuries had to bear on the discursive formations associated with the botanical sciences, of which botanical art forms an integral part. The process whereby indigenous knowledge was effectively written out of acceptable botanical practice (a trend that persists today) is evaluated. I determine what the current negative stigmas associated with the art form are and conclude that artists and botanists working within the discipline do not acknowledge the limitations of the art form in reflecting empirical "truths" and this leads to the creation of images that rely on tradition rather than innovation. I discuss my practical work in relation to the ideas presented in this thesis.

Hierdie tesis ondersoek die versteekte narratiewe in Suid-Afrikaanse botaniese tekeninge wat uit die laat sewentiende tot agtiende eeu dateer. Die versameling van plante en maak van gepaardgaande tekeninge val onder die vroeë modernistiese wetenskaplike praktyke van versameling en tentoonstelling. Bogenoemde tekeninge word vanuit 'n postmodernistiese oogpunt ondersoek as "tekste" wat gebruik is om koloniale botaniese agendas te staaf. Botaniese kuns het die "natuur" geobjektiveer en dit binne 'n tekstuele kode geplaas wat dit gesuiwer het en daarvan 'n toepaslike onderwerp vir studie deur Eurosentriese natuurfilosowe gemaak het.

Die impak van spesifieke wetenskaplike agendas aangaande die "natuur" hou verband met die stereotipering en die onderdrukking van beide inheemse sisteme van kennis en vroue. Hierdie thesis ondersoek die impak wat die komplekse historiese en sosiopolitese toestande gedurende die sewentiende en agtiende eeue op die beredenering rondom botaniese wetenskappe, waarvan botaniese kuns 'n integrale deel uitmaak, gehad het. Die proses waarvolgens inheemse kennis uit botaniese praktyk "uitgeskryf" is ('n tendens wat vandag voortleef), word beoordeel. Ek bepaal wat die huidige negatiewe stigmas is wat geassoseer word met die kunsvorm en kom tot die gevolgtrekking dat kunstenaars en botaniste wat binne hierdie vakgebied werk nie die beperkinge van hierdie kunsvorm erken insoseer dit empiriese "waarhede" weerkaats nie en dat dit lei tot tekeninge wat staatmak op tradisie eerdeer as innovasie. Ek bespreek ook my eie praktiese werk in verhouding tot die idees wat in hierdie tesis geopper word.

TABLE OF CONTENTS

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List of Illustrations

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Notes

I have given the title and spelling as appears on the sketches themselves, and not the current botanical name for them, this appears in the top left hand corner of each spread, unless no title is given, in which case the current botanical name is used. It was not possible to obtain the dimensions of all the work.

Fig. 6b. Artist unknown, *The flowers of Aloe dichtoma, quiver tree (1781–1784).* Watercolour on paper, 473 x 309 mm. Collection: *François leVaillant, traveller in South Africa and his collection of 165 watercolour paintings,* Library of Parliament, Cape Town. (LeVaillant 1973: *Plate 145*, Vol. 2).

Fig. 7. Heinrich Claudius (possibly), *Lachenalia hirta* (Thumb.) (c. 1685). Watercolour on paper, 330 x 210 mm. Collection: *Claudius album,* Plate B24. Acc. 7671. National Library of South Africa, Cape Town.

Fig. 8. Artist unknown, *Lachenalia hirta* (Thumb.) (1692). Watercolour on paper, 312 x 198mm. Collection: South African Museum, Cape Town. (Wilson, Van Hove-Exalto & Van Rijssen 2002: 72; Folio 48).

Fig. 9. Heinrich Claudius (possibly), *Lachenalia hirta* (Thumb.) (c. 1685). Watercolour on paper, 330 x 210 mm. Collection: *Fagel Ms. 984* Trinity College, Dublin. (Waterhouse 1931: Plate 795).

Fig. 10. Jan Moninckxx or Stephanus Cousyns, (possibly), *Hijacinthus Aethijopicus, monophijllos undulato, villoso, flore luteo* (1687–92). Ink drawing on paper. Collection: *Ms. germ. Qu. 238.* Staatsbibliotheek Preussischer Kulturbesitz, Berlin. (Wilson, Van Hove-Exalto & Van Rijssen 1996: 27).

Fig. 11. Engraver unknown, (detail) *Tab. LXXXVII.* (1767). (Petiver 1767: *Tab. LXXXVII.*). Collection: *Banksian Collection,* Botany Library, Natural History Museum, London.

Fig. 12a. Artist unknown, *Amaryllis* (1691). Watercolour on paper in bound volume. Collection: *Drawings Petiver, Banksian MSS No. 88,* G. N. 85.4. Botany Library, Natural History Museum, London.

Fig. 12b. Francis Masson (possibly), *Amaryllis sp.* (c.1793). Watercolour on paper in bound volume. Collection: *A collection of drawings by Francis Masson,* Natural History Museum, London.

Fig. 12c. A hand written note on end pages of *A collection of drawings by Francis Masson* saying: "*Collection of drawings by Francis Masson incorporating the series belonging to Sir Jospeh Banks (see Journ. Bot 1854 page 144), and those presented by Mr. Charles Lee in 1885 (see Journ. Bot 1885 page 227)". In pencil below: 'Nos 26 & 40 are by Webber and No. 35 by J. Cleverley jnr.*". Collection: *A collection of drawings by Francis Masson* Botany Library, Natural History Museum, London.

Fig. 13. Artist unknown, *Fig. 1 Pelargonium rapaceum, bofolium floribus maculatis* and *Fig. 2 Pelargonium rapaceum, foliis ternis, trilobatis &tridentatis, flore sanguinco* (1738–39). Printed engraving. (Burman 1738–39: 91; Tab. 35).

Fig. 14. Artist unknown, *Pelargonium incrassatum (Andrews) sim Geraniaceae* (c. 1692). Watercolour on paper, 312 x 198mm. Collection: *Codex Witsenii,* South African Museum, Cape Town. (Wilson Van Hove-Exalto & Van Rijssen 2002: 104; Folio 64).

Fig. 15. Artist unknown, *Pelargonium trifolium* (1601–26). Watercolour on paper, 410 x 260 mm. Inscription on page reads: "*Geranium* [crossed out] *Pelargonium* [in pencil above] *trifidum, 1601–26*" and right: *'Tab. 35, Fig. 2*" Collection: *Collection of watercolour drawings from the Cape, possibly by Voet, Burmann, Claudius, Oldenland, No. 60.* Botany Library, Natural History Museum, London.

Fig. 16. Heinrich Claudius (possibly), *Pelargonium* (c. 1685). Watercolour on paper. Collection: *Claudius album,* Plate B25. Acc. 7672: National Library of South Africa, Cape Town.

Fig. 17. Artist unknown (possibly Claudius), *Pelargonium trifidium Willd.* (c. 1685). Watercolour on paper. Collection: *Fagel Manuscript 984*, Trinity College Dublin. (Waterhouse 1931: Plate 869).

Fig. 18. Jan Moninckxx or Stephanus Cousyns (possibly) (1687–92). Ink drawing on paper. Collection: *Ms. germ. Qu. 238*. Staatsbibliotheek Preussischer Kulturbesitz, Berlin. (Wilson, Van Hove-Exalto & Van Rijssen 1996: 53)

Fig. 19a. Artist unknown, *Pelargonium* (c. 1691). Watercolour on paper, 200 x 170mm. Collection*: Drawings Petiver, Banksian MSS No. 88,* G.N. 84. 11, Banks Collection, Botany Library, Natural History Museum, London.

Fig. 19b. Engraver unknown, *Pelargonium* (c. 1691). Engraving. (Petiver 1767: *Fig. 11. Cat. 457*). The caption in the publication reads: "*11. Cape Crane bill with a red Flower and Turnep-root. Cat. 457*".

Fig. 20. Signed Webber, *Stapelia gordoni Mas.* (c. 1775). Watercolour and pencil on paper, 380 x 270 mm. Collection: *A collection of drawings by Francis Masson,* Botany Library, Natural History Museum, London.

Fig. 21. Johannes Schoemaker (possibly), *Stapelia* (c. 1775). Watercolour on paper. Collection*: Gordon Atlas RM 91. Rijksprentenkabinet*, Rijks Museum, Amsterdam. (Cullinan 1992: 174; 78).

Fig. 22. Engraver: Makenzie, *Stapelia gordoni* (1796–97). Hand-coloured engraving on paper. (Masson 1796–97: 40).

Fig. 23. Robert Jacob Gordon (possibly), *Pachypodium namaquanum* (c. 1779). Watercolour on paper. Collection: *François leVaillant, traveller in South Africa and his collection of 165 watercolour paintings,* Library of Parliament, Cape Town. (Arnold 2001: 35; Plate 17).

Fig. 24. Signed Webber, *Pachypodium namaquanum* (c. 1775). Watercolour and pencil on paper, 385 x 280 mm. Collection: *A collection of drawings by Francis Masson*, no. 40. Botany Library, Natural History Museum, London.

Fig. 25. Johannes Schumacher (possibly), *Pachypodium namaquanum* (c.1775). Watercolour on paper. Collection: *Gordon Atlas RM 26. Rijksprentenkabinet*, Rijksmuseum, Amsterdam. (Cullinan 1992: 110; 47).

Fig. 26. Engraver unknown, *Pentandra monogynia: From the Great Nimaqua Land* (1789). Hand-coloured engraving on paper, 210 x 280mm. (Paterson 1789: 124).

Fig. 27. Artist unknown, *Stapelia* (c. 1685). Watercolour on paper, 310 x 195mm. Collection: Breyne's *Flora Capensis*, Brenthurst Library, Johannesburg. (Gunn & Du Plessis 1978: 141; Plate 59).

Fig. 28. Artist unknown. *Stapeliae Dec. pl. Afric: Tab. 12 Fig. 2* (1755). Watercolour on paper, 260 x 365 mm. Collection: Burman, Johannes. 1755. *Afbeeldinge van enige Caapsche gewassen, dogh meest*

Opening the curiosity box:
Botanical images as sites of transformation for the scientific practices of annotation and display in the seventeenth and eighteenth centuries

Introduction

Botanical art occupies a rather strange, complex and under-acknowledged place within the visual arts. It has one foot planted in the sciences and the other in fine arts. Because of its link to the sciences, botanical art claims to foster an "objective" habit of mind, yet the process of making images inevitably changes the way "nature" is viewed. The images produced are influenced by the individual perception of the artist and a desire to create something beautiful and useful to science. This thesis aims to determine the hidden narrative implicit in primarily late seventeenth–to eighteenth–century botanical images of South African plants intended to be in the service of botany. In this thesis botany is understood to be a Western construct and its rules of formulation are not shared by indigenous cultures that have other ways of categorising and interacting with "nature". The early "explorers"[1] and plant hunters were instrumental in laying the foundations for an empirical scientific visual language. I take a liberal interpretation of what I consider to be an image: the discussion will include some actual herbarium samples collected and taken back to Europe; the watercolour sketches made from "nature" and printed reproductions of images based on those sketches from published books. My practical work draws on the ideas presented in this thesis by questioning the validity of scientific episteme[2] with special reference to botanical art. As authors Nicholas Jardine and Emma Spary observe in the introduction to *Cultures of natural history* (1996): "Even when ecologists and naturalists venture into 'virgin' territory the object of their observations is not raw nature, but nature measured and graded, classified and tagged, registered and simplified" (1996: 12). How "nature" is manipulated for the purposes of scientific study are central themes I explore in my practical work.

I establish through my argument whether the highly manipulated, deeply constructed, interpretive botanical images can be said to undermine attempts at scientific episteme. "Nature" is never studied in a form distinct from human endeavour, instead it is used to construct and validate particular subjectivities. In this thesis "nature" is not seen as being pristine and unadulterated. Instead it is understood in the context of how it is graded and classified by humans imposing their understanding on it. The impact of particular scientific agendas about "nature" can be linked to the stereotyping and subjugation of indigenous knowledge systems. The art associated with botany provides testimony of the colonial desire to control and take ownership of "nature". This research considers the impact that the complex historical and socio-political situations of the seventeenth and eighteenth centuries had to bear on the discursive formations associated with the botanical sciences, of which botanical art forms an integral part.

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[1] The terms "discover" and "explore" pepper most of the travel accounts I have consulted. Generally what is inferred is that these "discoveries" were new to European knowledge systems. I find the terms problematic because they imply that something only becomes real once a European has inflicted his/her understanding on it. It subjugates the fact that all the plants and places the Europeans "discovered" were known, understood and utilised for hundreds or even thousands of years by local peoples.

[2] See Appendix A for a full discussion of the various interpretations of the term episteme.

Botanical art provides a visual record that reflects the mindsets of those that created or commissioned the images. The seemingly "objective" habit of mind that scientific investigation fosters provides evidence of culturally loaded projections. A society's artistic aesthetics and those of individual artists continually contribute towards the shaping of ideas about taxonomic order.[3]

The impact of colonial dominance on indigenous culture

The images I interpret provide evidence of a narrative of colonial exploitation. The rules determining taxonomic order were governed by the assumption that the European mind was more capable of understanding the underlying order within "nature" (expressed through taxonomic classification systems), than the indigenous people who already had a vast understanding of those plants. This theory is supported by the fact that Carolus Linnaeus (1707–1778) forbade the retention of local names for plants, an example of the dissemination of European ideas that served to legitimise the authority of the colonists over the colonised. The success of European discourse is that it not only affects the way Europeans see other cultures, but it also changes how other cultures view themselves in relation to it (Dietrich 1993: 6). Indigenous knowledge of plants is subverted and repressed and European scientific discourse prevails.

Field sketches and plant collections played an integral role in refining, popularising and "proving" theories for the classification of plants under a universal system postulated by natural philosophers[4] like Linnaeus. Plant images became decontextualised from their origins when they were taken to Europe as scientific artifacts. These "texts"[5] were collected, removed from their natural environment and isolated for the intended purposes of study and curiosity. The botanical artworks therefore reflect the will of natural philosophers to control the natural world and hence to control it. These "texts" therefore exist in a web of European culture, "nature" and community. Historical and cultural contexts are important in understanding the scientific, political and social will behind the production of images.

[3] Taxonomist Clive Stace gives the following as a definition of taxonomy: "Taxonomy may be defined as the study and description of the variation of organisms, the investigation of the causes and consequences of this variation, and the manipulation of the data obtained to produce a system of classification" (1980: 5). He also gives insight as to some of the debate around the subject: "Taxonomy can lay claims to being the oldest, the most basic and the most all-embracing of the biological sciences; it is certainly one of the most controversial, misunderstood and maligned. These properties are all closely related to the nature of taxonomy itself. As one of its purposes is to provide a service to non-taxonomists, its principles and practices come under scrutiny by non-specialists more often than is the case with most sciences, and the lack of understanding resulting from such usage is the cause of much of the mistrust and criticism often directed at it" (1980: 5).

[4] "The word scientist was only invented in the nineteenth century and only came into routine use in the twentieth. 'Scientists' called themselves natural philosophers" (Shapin 1996: 3–5).

[5] A "text" can be an image because we read images like we do words and they both signify meaning to us. In *Visual signs* editor David Crowe explains the culturally embedded attitudes that we have to different forms of communication, giving some priority over others: "Communication has a hierarchy that is deeply embedded in our societies. All of us carry attitudes, learnt over the years, which organise communication into systems of differences" (2003: 9). The kind of media used to carry a message will subliminally determine how we take the message. Our reaction to "texts" are therefore culturally bound, we believe that certain bits of communication have more credibility than others; the same could be said of how we regard the sciences, we tend not to question their authority.

Taxonomy: the need for order

The implicit bias present in the taxonomic systems arguably undermined empirical investigations of "nature" in the late seventeenth and eighteenth century. Current scientific discursive formations, specifically taxonomy, can arguably be traced back to the period somewhat dubiously termed the "scientific revolution". This so-called "scientific revolution" was confined to Europe. The "universal languages" were products of what Foucault called a taxonomic episteme, which, Slaughter argues, is an episteme predicated on a philosophy of Aristotelian essentialism (Slaughter 1984: vii).

There are certainly social and political factors that have a bearing or influence on the hard sciences – the voyages of exploration, for example, were largely a result of European nations' desires to expand their trade routes and political interests. This caused a massive influx of previously unknown natural specimens to Europe and the early botanists were challenged to find legitimate ways of understanding and categorising them. Scientific historian Mary Slaughter's thesis *Universal languages and scientific taxonomy in the seventeenth century* (1982) is that universal languages were attempts to create taxonomic nomenclatures. She argues that for the most part the motivation of the language projectors was more scientific than linguistic. Slaughter maintains that taxonomic "universal languages" came about in response to linguistic inadequacy precipitated by socio-cultural events such as the information explosion of the Renaissance and early seventeenth century, the specialisation of science, and the development of a literate culture. She approaches the "universal languages" through the tradition of biological science because it provides a view of language that implies that language reflects properties of a real world rather than of the mind.[6] Her intent is to relate the universal languages to social, historical and intellectual contexts. She uses French philosopher and historian Michel Foucault's (1926–84) ideas on taxonomy as a representational system or language for her argument (Slaughter 1982: vii–ix). Her thesis argues that the natural philosophers decentred "nature" to suit their own agendas. The seventeenth–and eighteenth–century "universal languages" movements proposed the use a codified naming system for all natural phenomena. The movement was largely underpinned by the taxonomic practices developed by Linnaeus. The early taxonomists like A. Caesalpino (1519–1603), the Bauhin brothers Jean Bauhin (1541–1631) and Gaspard Bauhin (1560–1624), J. P. Tournefort (1656–1708) and J. Ray (1627–1705) all contributed towards the ideas that Linnaeus developed (Stace 1980: 24). Linnaeus, however, is considered the "founder of modern taxonomy" (Stace 1985: 27). Linnaeus's universal language of binominal nomenclature was not initially accepted whole-heartedly among natural philosophers. Competition was fierce among natural philosophers to have their ideas accepted.[7]

Theoretical basis of the thesis

The ideas discussed in this thesis present a particular point of view and one that reflects my own personal interests. I draw upon ideas generated by many disciplines – philosophy, botany, artistic critical theory and history. I rely on them to uncover, examine and sometimes question some "definitive" ideas about scientific discourse. The methodology of postmodernism is used to establish

[6] Radical skepticism maintains that it is impossible to obtain reliable knowledge of the world; that it is impossible to trust one's senses to accurately reflect reality (Sokal & Bricmont 1998: 180).
[7] One example, among many, of this rivalry was of M. Adanson's (1727–1806) opposition to Linnaeus's system. He considered Tournefourt's classification, on which he based his own work, to be far superior (Stace 1985: 32).

the mutual relationships between systems of "truth" and modalities of power and to explore the political will behind the production of "truth", which in this thesis is equated with scientific episteme.

Direct sense experience was heralded as the main source of knowledge in the seventeenth and eighteenth centuries. Many philosophers like Galileo Galilei (1564–1642), Réne Descartes (1596–1650), Francis Bacon (1561–1626) and Sir Isaac Newton (1643–1727) and Johann Wolfgang von Goethe (1749–1832), devoted time to deciding on how to methodically discipline the senses to perceive accurately (Shapin 1998: 93). The Modernist[8] discourse of science hence regarded itself as being more refined and advanced than those used in pre-modern societies. The Enlightenment philosophers mistrusted the medieval translations of ancient texts (Jansen 1977: 366). Modernist discourse also assumed authority over indigenous cultures. In her thesis *Writing white on black: Modernism as discursive paradigm in South African art writing on modern black art* (2005) art theorist Lize van Robbroeck cites the postmodern critic Dalmayr who explains:

> The notion that modern subjectivity constitutes a radical break from previous subjectivities is accompanied by the idea that the modern subject has a more refined and progressive subjectivity than the 'collective' subjectivities implicit in pre-modern societies. For Kant, modernity means the progressive refinement of consciousness and subjectivity. This concept of modern subjectivity as refined and superior is endorsed by the developmental model of human subjectivity which has remained dominant throughout the unfolding of modernity (2005: 42–43).

Postmodern theory generally concurs that meaning is said to be derivative and linked to hierarchies of political power and national histories.[9] This is one of the essential ways that postmodern theory differs from modernist ideas. Postmodernism stresses the importance of understanding the historical factors that determine the production of any discourse. The theory is aimed at determining the culturally loaded assumptions that can undermine scientific episteme. As French literary critic and theorist Roland Barthes (1915–80) asserts in his essay entitled *Mythologies* (1974):

> Ancient or not, mythology can only have an historical foundation, for myth is a type of speech chosen by history: it cannot possibly evolve from the nature of things (1974: 110).

Historically the forms inherited by botanists or natural philosophers for understanding plants include taxonomy, folk taxonomy, curiosity collecting and travel accounts. The rules that govern these aspects of botany literally provide the words that form thoughts about the plant kingdom. Practically speaking, postmodernism is committed to the task of dissolving the dominant language games which have hitherto cemented together and "naturalised" a particular – modern – form of social bonding (Keane 1992: 87). French philosopher Jean Lyotard (1924–98) described "grand narratives"[10] in his essay *The postmodern condition: a report on knowledge* (1979), where he claims that they legitimise politics and culture through their discourse. I determine the subjectivities that underpin the "grand narratives"

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[8] See Appendix A for a discussion of the use of this term.

[9] For an in-depth discussion see particularly: Michel Foucault's *The order of things: archaeology of the human sciences* (1970) and *Discipline and punish: the birth of the prison* (1977) and Jean Lyotard's *The postmodern condition: a report on knowledge* (1984) translated by G. Bennigton & B. Massumi.

[10] For example, "According to the Enlightenment grand narrative, reason will free the world from superstition and produce universal knowledge" (*Dictionary of critical theory* 2001: sv. "grand narratives or metanarratives").

of botany using this theory. I discuss the consequences the discourses developed by the "hard" sciences had for those scientists who controlled the production of knowledge. Empirical thought is subject to different influences and I argue that personal beliefs, political backgrounds and social structures must be considered when evaluating the progress of scientific episteme.

Postmodern versus modernist critique of the sciences[11]

There has been some hard-hitting critique of postmodern readings of science. In *Intellectual impostures* (1998), theoretical physicist Alain Sokal and professor of theoretical physics Jean Bricmont have shown how key postmodern thinkers (mainly French philosophers) have repeatedly abused scientific concepts in their work. Their negative, well-argued criticism of the ideas postulated by postmodern philosophers regarding the hard sciences has been worth considering for my thesis. Sokal and Bricmont criticise the social sciences for their lack of applying any form of empirical testing to their ideas. This probably explains their impunity at the postmodern premise which they claim regards science as a "myth", a "text" or merely a social construction.[12] Sokal and Bricmont identify a basic problem with this critique – they claim that to disregard the empirical aspects of science by concentrating on language and theoretical formalism is akin to "throwing the baby out with the bathwater" (1998: 180):

> The link between a scientific theory and its experimental test is often extremely complex and indirect. Therefore, a philosopher will tend to approach the sciences preferentially through their conceptual aspect (so do we, in fact). But the whole problem comes precisely from the fact that, if one does not also take into account the empirical aspects, then scientific discourse indeed becomes nothing more than a 'myth' or 'narration' among many others (1998: 186).

While I do not agree that the social sciences need to engage in any form of empirical testing,[13] they do need to back up arguments correctly, and have a comprehensive understanding of the science they intend to criticise. Scientists seem satisfied that they have put enough checks and balances in place to provide them with reliable, quantifiable results.[14] However, scientists have never been and hopefully

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[11] This is discussed in more depth in Appendix A.

[12] "First of all, the author or the literality of the text have, in literature, even in philosophy, a relevance they do not have in science. One can understand physics without ever reading Galileo, Newton or Einstein, and study biology without reading a line of Darwin. What matters are the factual and theoretical arguments these authors offer, not the words they used. Besides, their ideas may have been radically modified or even overturned by subsequent developments in their disciplines. Furthermore scientists' personal qualities and extra-scientific beliefs are irrelevant to the evaluation of their theories. Newton's mysticism and alchemy for example, are important for the history of science and more generally for the history of human thought, but not for physics" (Sokal & Bricmont 1998: 185).

[13] "The necessity of empirical tests goes back at least to the seventeenth century, and is simply the lesson of empiricism: the rejection of *a priori* or revealed truths. Besides, predictions are not always the most powerful tests; and those tests may take relatively complex forms, which cannot be reduced to the simple falsification of hypotheses taken one by one" (Sokal & Bricmont 1998: 65).

[14] "In practice, experience is not given; we do not simply contemplate the world and then interpret it. We perform specific experiments, motivated by our theories, precisely in order to rest the different parts of those theories, if possible independently of one another or, at least, in different combinations. We use a set of tests, some of which serve only to check that the measuring devices indeed work as expected (by applying them to well known situations). And, just as it is the totality of the relevant theoretical propositions that is subjected to a falsification test, so it is the totality of our empirical observations that constrains our theoretical interpretations. For example, while it is true that our astronomical knowledge depends upon hypotheses about optics, these hypotheses cannot be modified in an arbitrary way, because they can be tested, at least in part, by numerous independent experiments" (Sokal & Bricmont 1998: 63–64).

will never be beyond criticism. I am indebted to Londa Schiebinger for her essay *Lost knowledge, bodies of ignorance and the poverty of taxonomy as illustrated by the curious fate of "Flos pavonis", an abortifacient* (1998). Her essay gives a well-constructed postmodern argument for considering the hidden narratives implied by taxonomic practices.

Botanical art: The poor relative to fine art

Botanical art is located within the discipline of fine art, yet it still remains the subject of negative stereotyping from within the fine art community. It is not an art form that is collected by many major South African art galleries, despite South Africa's dominance within the field. Most collections are housed in libraries and access to these collections for the general public is highly controlled. Most libraries, for example, will only allow access to these collections if you are studying through an institution. Certain institutions deny access to their collections. No major exhibitions dedicated to botanical art have ever been held at any of these galleries. I argue that botanical art still suffers from negative stigmatisation encoded by Modernist prejudice of illustration as being an inferior art form because it fulfills a practical function.

The confluence of my theoretical with my practical work

The MPHIL (Illustration) degree is made up of a practical component that is considered of equal value to the theoretical component. The two elements exist side by side and while I enter into a discussion of my practical work here, it is not the main emphasis of my thesis. I discuss how the ideas presented in the thesis have influenced my practical work. I raise questions about the use of botanical art and travel journals as accepted tools of science. I derive inspiration for my practical work from collections of curiosity I have researched for this thesis and refer to and invert their meaning. My intention is to comment on their function as sites of "truth". I do this through the arbitrary collection of plants that interest me, compositing images from many sources and overlaying these with texts from other sources. My practical component comments on the quirky, odd human behavioural and psychological factors that motivate collecting and the desire to create order and meaning out of the abyss, and how these systems subjugate indigenous knowledge.

I discuss the methodologies that I have invented in my painting. I reveal how they are important to the meaning I wish to evoke in my work. I essentially have created my own personal curiosity collection of plants. The arbitrary nature of the collection is important to me because it emphasises the fact that many of the early botanical collections were based on the personal interest, tastes and desires of the collectors, and not on any sound scientific basis.

The point that I most want to assert is that scientific episteme is an illusion, supported and validated by its own discourse. The more sinister side of my commentary deals with the subordination of indigenous knowledge systems by colonists who assumed that they had the right to rename every living thing they encountered. This intense "othering" of indigenous knowledge and people has had serious repercussions for how Africa had been perceived by European culture.

Travel accounts, journals, manuscripts and botanical publications (literature review)

The extensive research for this thesis has incorporated visits to the collections of seventeenth–and eighteenth–century drawings, botanical publications, journals and manuscripts. The collections housed in the libraries and herbaria of the botany department of the Natural History Museum in London, the National Botanical Institute in Pretoria, Bolus and Compton herbaria, the National Library of South Africa, the South African Museum in Cape Town and the Africana collection at the University of Stellenbosch Library, have provided most of the visual material used in this thesis. I have been fortunate to have consulted Johannes Burman's *Rariorum Africanarum plantrum decades* (1738–39), Johannes Commelin's *Horti Medici Amsterdamensis Rariorum Plantarum Descripto et Icones* (1697), Leonard Plunkenet's *Phytographica* (1691) and Francis Masson's *Stapelieae Novae* (1796–97). I have also studied the original codices of drawings commissioned or owned by Joseph Banks (1743–1820), Francis Masson (1741–1805), James Petiver (1663–1718), Johannes Burman (1707–1779) and Nicolaas Witsen (1641–1717).

No self-respecting botanical worker should be without Mary Gunn and L. E. Codd's *Botanical exploration of Southern Africa* (1981). The work has been indispensable for its succinctly written biographical information. It also provides important information about the collections of South African work obtainable both here and abroad. I have also studied, amongst others, written and illustrated accounts by François leVaillant (1753–1824), Anders Sparrman (1748–1820), Simon van der Stel (1639–1712), Jacob Wikar (1752–), Robert Jacob Gordon (1743–95), Carl Peter Thunberg (1743–1828), William Paterson (1755–1810) and William Burchell (1781–1863), some from the original publications and others from the Van Riebeeck Society editions.

The publication *Annotated watercolours of landscapes, flora and fauna observed on the expedition to the Copper Mountains in the country of the Namaqua undertaken in 1685–6 by Simon van der Stel, Commander at the Cape of Good Hope. Copied at the Cape in 1692 for Nicolaas Witsen, mayor of Amsterdam, member of the Amsterdam chamber of the Dutch East India Company, ambassador to Great Britain, &c, &c* (2002) edited by M. L. Wilson, T. T. van Hove-Exalto and W. J. J. van Rijssen was an indispensable resource in researching my thesis. L. C. Rookmaker's *The Zoological Exploration of Southern Africa 1650–1790* (1986) and *François leVaillant and the Birds of Africa* (2004) provides excellent contemporary insight on LeVaillant. Poet Patrick Cullinan's *Robert Jacob Gordon* (1992) provides valuable insights into Gordon. Vernon S. Forbes's various works on the pioneer travellers of South Africa in the seventeenth and eighteenth centuries gives thoroughly researched analysis of their achievements and their mistakes. Marion Arnold's *South African botanical art: Peeling back the petals* (2001) has been an important resource. Scientific historian Steven Shapin gives a postmodern background to the "scientific revolution" and questions the very term. Scientific historian A. G. R. Smith provides a modernist reading of the same subject in *Science and society in the sixteenth and seventeenth centuries* (1972).

Chapter 1: The historical, religious and philosophical background of the "scientific revolution" that gave rise to various collecting and annotating practices of botany

A specific historical background of scientific thought in the seventeenth and eighteenth century is given with a view to identify the central ideas that gave rise to the practices associated with annotation and classification of plants. The discussion centers on some taxonomic practices developed by Linnaeus, which consciously edited out information about collected specimens – specifically the information that dealt with the plant's connection to existing indigenous knowledge. The discourse of taxonomy is thus seen as a discourse of exclusion.

Historically, natural philosophers were developing observational techniques, experiments and measuring devices that would provide the empirical evidence they required to help them to understand and quantify "nature". Travel journals, herbarium sheets and field sketches were part of the discursive practices developed and used in this era. "Here is the root idea of modern empiricism, the view that proper knowledge is and ought to be derived from direct sense experience" (Shapin 1996: 69). Nature's "book" was regarded as the only plausible, reliable "text". Yet the field sketches, herbarium sheets and journals kept by plant hunters often provided the only physical link to "nature" that natural philosophers deemed so important for making their observations. The practices of collecting and depicting plants decontextualise and objectify "nature" by cutting all ties to a plant's environment. Hence the object of scientific study was a flattened, graded, labelled and manipulated form of "nature" that was further abstracted by its presentation in a 2-dimentional format.

The influence of the Church and the religious and social influences on the thinking of natural philosophers are described. I argue that Linnaeus's classification was influenced, amongst other reasons, by his religious convictions. Approaches adopted by these natural philosophers were embedded in what they believed could be discovered through the study and observation of "nature".

The voyages of discovery are contextualised to show their impact on botanical knowledge. Art historian Barbara Stafford provides postmodern perspectives on these voyages. The voyages of discovery not only enriched the countries of origin by expanding their empires, they were also important in the spreading of taxonomic practices and colonialist ideology.

Chapter 2: Travel accounts, journals, manuscripts and the voyages of discovery: a legitimising force for science

The historical context that endorsed the use of the travel journal as a tool of science is described to demonstrate how its emergence was a means of legitimising scientific observation and knowledge. Although direct-sense experience was regarded the most reliable source of information for a natural philosopher, not all were willing or financially in a position to make the long, dangerous journeys. This is part of the reason why the travel journal became an important tool for botanical investigations. In this chapter I discuss the validity of these documents as tools of science, making particular reference

to some of the more prominent published journals of the era. These journals played a crucial role in disseminating ideas that had far-reaching consequences.

I comment on how these published journals influenced European perceptions of the "new worlds" and endorsed negative stereotypes about indigenous people. The process whereby indigenous knowledge was effectively written out of acceptable botanical practice (a trend that persists today) is evaluated.[15] The only time that indigenous knowledge was considered important was when it provided colonisers with opportunities to make money or to help them survive in these "new worlds".

The influence that printing had on the dissemination of ideas is discussed. The idea that the printed word and images represented a further decontextualisation of a plant is introduced. The commercial interests of some of the "explorers" are discussed in contrast to those collecting specifically for the purposes of science. This is contextualised within the wider frame of increasing colonisation and imperialism, especially by British imperialism. The impact of these strong ideological influences on indigenous knowledge is outlined to assert the idea that this history not only influenced how peoples were "othered" by colonialism, but that this history of ownership and control can also be traced through plant transfers.

Chapter 3: Disciplining "nature": a discussion of the use of botanical art as an intended means of reflecting "truth"

In this section I raise questions surrounding the adequacy of botanical illustration as a means of representing the "truth". I provide an in-depth look at some of the rules that underpin botanical practices – particularly the use of Latin. The "universal language" movement is shown to be an attempt to "end the confusion of generic names" (Stafleu 1971: 161). The focal point of the taxonomic scheme was "to create order in and of nature" (Slaughter 1998: 3). I elaborate on how the choice of botanical Latin by Linnaeus for his system of binominal nomenclature[16] was intended as a "universal language" for classifying all of "nature". This system effectively undermined the indigenous knowledge systems that existed before Europeans arrived in Africa by banning the use of "barbarous" names within his naming and classifying system (Schiebinger 1998: 136).

I make comparisons between copies of the highly prized field sketches I have unearthed. I discuss how the copies both reflect and sometimes fail the empirical aims of the era. I conclude that this study enhances what scientific historian Eric Forbes has identified as "the need for a study of the history of science that will reveal both the limitations of its hypothetico-deductive methodology and the role of imagination in scientific creativity" (1989: 8).

The individual interpretation that an artist asserts on an image can never be totally controlled under perfect conditions and this is what makes the art form so difficult to fit into a purely scientific discourse. I examine the social practice that has given rise to anonymity of authorship associated with

[15] Ethno botany is a relatively new area of botany.

[16] "According to this system the genus is described in the first and the species is differentiated in the second name given to a plant. Linnaeus created first a nomenclature of diagnostic names and then he created another, parallel set of designatory names; these were the true binomials" (Slaughter 1986: 79).

botanical illustration. This practice of not acknowledging the artists and guides that accompanied the "explorers" reflects a Eurocentric will to name, own and control. I do not intend to try to unravel the mystery of authorship of the works I will be discussing; instead I take botanist John Rourke's cue on this issue:

> Much ink has been spilled in learned publications in attempts to unearth the identity of these artists, to establish which is their work and which are copies – for copying did not seem to have the same connotations in the 1700s as it does today. But despite these profound enquiries it is a sad fact that we will probably never know very much about the men who produced these delightful paintings – humble, largely anonymous servants of the mighty Dutch East India Company (Rourke 2001: 32).

There's a tension behind the fact that the early plant "explorers" to the Cape (usually highly educated men) were looking for plants that would excite, amaze and interest Europeans, but were reliant on the extensive botanical knowledge held by their indigenous guides. That all the plants the botanists "discovered" were shown to them by their guides, and that the majority were already known, named and in use by indigenous peoples before these botanists and plant hunters arrived at the Cape, are conveniently forgotten facts. Foucault's ideas about the production and control of knowledge are important for my analysis, because I set out to determine the underlying biases and how these prejudices influenced the natural philosophers.

Chapter 4: Cultural and political influences behind curiosity collecting in South Africa

In this chapter I examine the impact and role that curiosity collecting[17] (of which plant collecting and field sketches form an integral part) played in forcing the image of "otherness" on South Africa by European botanical discourse. I discuss the influence the ideas presented in this thesis have had in determining my own practice as an illustrator.

Curiosity collections were an assembly of specimens and objects collected by an individual precisely to engage people's curiosity. The desire to find unusual, bizarre and rare objects was growing. Curiosity collections served evolving purposes – from entertainment to fulfilling scientific agendas. While late eighteenth century collections were governed by taxonomic order, earlier ones tended to be organised into categories that only served to impress and delight audiences and had little to do with any scientific system for understanding the natural world. Plant collecting was part of early modernist scientific practice of collection and display. What is practiced today, as then, is intrinsically linked to how humans interact with "nature". I rely on Werner Muensterberger's *Collecting: An unruly passion, psychological perspectives* (1994) for his perspectives from a psychological point of view:

[17] "The comparatively sudden wave of collecting in the encyclopedic manner that became prominent toward the close of the sixteenth century was no doubt stimulated by the discovery of hither-to unknown objects from other continents. The curio cabinet, or Wunderkammer, was supposed to represent the miracles of the world. The paintings and cabinets of the period provide fine documentary evidence of this sometimes bewildering display of all kinds of examples, of naturalia as well as specimens of the material culture of recently discovered civilizations. It marked an attempt to create an allegorical cosmos that would permit the viewers to take pleasure in a fanciful, and much condensed, view of a good part of the entire universe" (Muensterberger 1994: 188)

> ... I wanted to examine collectors' motivations and the dynamics of their undertakings. I was looking for convincing insight into what constitutes the impelling factors of their passion, their commitment, and the nature of their occasionally baffling conduct in response to their wishful longings (Muensterberger 1994: 251).

Toby Musgrave, Chris Gardner and Will Musgrave's *The plant hunters: Two hundred years of adventure and discovery around the world* (1998) provides useful perspectives on collecting from an historical perspective, and also discusses the role of plant transfers in Empire building.

Conclusion

In conclusion I consider the issues encompassed by this thesis, and demonstrate that the botanical images discussed operate as "texts" located within scientific discourse and serve a Eurocentric conception of "nature", one that sublimates indigenous knowledge. Linnaeus's attempts to popularise his theories of taxonomic groupings (that have been widely discredited today), are shown to have formed part of a coercive strategy that effectively excluded the need to record indigenous taxonomic information. The choice of Latin by Linnaeus for botanical plant names (still in use by botanists today) is a discourse of exclusion; one which ignores indigenous-centered knowledge and makes botany inaccessible to many people including eighteenth–century women. The discursive formations surrounding taxonomic practice are sustained by political power structures in their seventeenth and eighteenth century given social and historical environment. I show that curiosity collecting contributed to long-lasting discursive formations of taxonomy that have persisted into our era. The residue of sexist and racist prejudices is apparent in contemporary taxonomic discursive practices. The languages and images employed by natural philosophers therefore embody a "hierarchy of power", as referred to by Foucault in *Archeology of knowledge* (1970). I critically tie these practices into my own work. I intend to challenge some assumptions that exist about botanical images as objects of "science". I locate this thesis within the growing body of writing and criticism of Modernist scientific discourse.

Chapter 1: The historical, religious and philosophical background of the "scientific revolution" that gave rise to various collecting and annotating practices of botany

The aim of this chapter is to give a specific historical background of the late seventeenth to eighteenth century that gave rise to the internationally accepted scientific discourse of annotation and classification. The use of botanical art is seen as a legitimising influence within this discourse. In this thesis "scientific" discourse is shown to be a construction that emerges through the legitimisation of various texts by "experts" within the field of botany. Botanical art could be seen as a "text" that is used by scientists to legitimise their own rules. The lavishly printed and illustrated travel accounts are described to give context to their use as tools for scientific study.

The "scientific revolution"

Shapin claims in *The scientific revolution* (1998) that there is no such thing as the "scientific revolution". He argues that it is a term that incorporates many ideas and critiques about the period from the late sixteenth to the early eighteenth centuries. He says that in the past the period was written about as though it was a definitive conceptual revolution that fundamentally changed our way of thinking about natural phenomena. Shapin explains contemporary ideas about the era: "[I]t was, moreover, construed as a conceptual revolution, a fundamental reordering of our ways of *thinking* about the natural" (1998: 2–4).

Shapin contests whether there was any singular and discreet event, localised in time and place that can be pointed to as *the* scientific revolution. He claims there is cause to reject the notion that there was any single coherent cultural entity called "science" in the seventeenth century to undergo revolutionary change. There was, rather, a diverse array of cultural practices aimed at understanding, explaining, and controlling the natural world, each with different characteristics and each experiencing different modes of change. Shapin is dubious about claims that even today there is anything like "a scientific method" – a coherent, universal, and efficacious set of procedures for the production of scientific knowledge – and still more sceptical of writings that locate its origin in the seventeenth century (Shapin 1996: 2–4).

He claims that the "scientific revolution" is characterised by "the depersonalisation of natural knowledge: the growing separation between human subjects and the natural objects of their knowledge, especially as evinced in the distinction between mundane human experience and views of what nature 'is really like'" (Shapin 1998: 13).

The new method

The new method refers to the innovations regarding observation, experimentation and empirical capturing of data made by Bacon, Descartes and Galileo. The different approaches to scientific

methodology by these natural philosophers are briefly outlined in this section. According to scientific historian Alan Smith who gives a more modernist reading of the "scientific revolution":

> The modern scientific method created by the ideas of Bacon, Descartes and the work of Galileo can perhaps be summed up as follows: careful observation of and experiment on the phenomena of the real world; the induction of general ideas from these observations and experiments; the testing of the general concepts so formed by deductions from them and by further experimentation to verify these deductions; the application of precise measurements, involving the use of mathematics, during the experiments; and the ability to transcend the physical realities of the world and frame general concepts about the behaviour of bodies based on their fundamental properties, such as motion. Galileo, the man who put these ideas into practice, was the first 'modern' scientist, the first to apply recognisably modern scientific methods to the study of nature (1972: 72–6).

In order for the individual scientist's senses to become trained so as to not be foiled by misunderstanding that was being perceived, a set of rules was proposed by philosophers such as Francis Bacon and Isaac Newton.[1] These explicitly formulated rules aimed to discipline "the production of knowledge by managing or eliminating the effects of human passions and interests" (Shapin 1998: 13). Bacon emphasised the importance of experiments and stressed the need to systematically build up a body of empirical knowledge based on the results of these experiments, from which theories could be established and tested. "Once a sufficient number of phenomena had been investigated... then general theories could be produced by induction, the method of reasoning which he described in *Novum Organum* (1620)" (Smith 1972: 72). "Even before they had published their ideas Galileo had put them into practice, combining both approaches, a methodology which is still widely accepted today as being correct" (Shapin 1998: 95). And Harold Cook says that Bacon "became famous in later generations for making trials of experience, or "experiments", into one of the foundation-stones of his natural philosophy" (Cook 1996: 99). Sokal and Bricmont confirm these principals as being the basis of contemporary methodology:

> Modern science tries to carry out these operations in a more careful and systematic way, by using controls and statistical tests, insisting on replication, and so forth. Moreover, scientific measurements are often much more precise than everyday observations; they allow us to discover hitherto unknown phenomena; and they often conflict with 'common sense'. But the conflict is at the level of conclusions, not the basic approach. For example: Water appears to us as a continuous fluid, but chemical and physical experiments teach us that it is made of atoms (1998: 54).

According to Shapin and Smith, Descartes's contribution to scientific methodology was different. He provided the mathematical aspect of establishing a scientific theory that Bacon's methodology lacked. Descartes is famous for his deductive reasoning that Shapin describes:

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[1] "Leibniz, Spinoza and Descartes each attempted to construct an all-embracing philosophical system, but John Locke, the other outstanding philosopher of the period, abandoned such ambitions. He approached the problems of philosophy in a quite different way to Descartes, using what he called a 'historical, plain method', as opposed to Descartes's rigidly deductive system. In his *Essay Concerning Human Understanding*, published in 1690, he took the individual contents of the mind one by one and examined them to see what they were. The whole of knowledge, he argued, consisted of the collection and comparison of ideas. His was an empirical approach which stressed the role of experience rather than logical deduction in the acquisition of knowledge" (Shapin 1998: 95).

> In his famous *Discours de la méthode* he started by doubting everything except the fact of his own existence and proceeded to deduce the existence of God and of the whole material universe. He intended that each step in his argument should be as clear and certain as a mathematical proof. His methodology was thus the perfect compliment to Bacon's emphasis on experiment and induction (1998: 95).

Any methodology is a construction – it is an abstract system that provides a framework for reasoning, deduction and understanding. Shapin raises a lucid point about the myth implied by these scientific methodologies:

> Methodology may be in part, as it has been called, a 'myth', but myths may have real historical functions. Methodological pronouncements like Bacon's were avidly seized on by later, especially English, natural philosophers to justify a concerted collective program of observational and experimental fact collecting, while broadly deductive methodologies were used by other sorts of philosophers to justify the importance of rational theorising over the accumulation of factual particulars. Formal methodology is important, therefore, in the same way that the justification of a practice is important to its recognised identity and worth (1998: 95).

The influence of the Church and religious beliefs of scientific philosophers

The religious convictions of philosophers did influence their thinking and this raises questions as to whether this compromised the scientific episteme of their theories. This has direct repercussions for botanical art that provided the visual support to some of these theories. In the middle ages philosophers and scientists used religion and ancient Greek teachings to confirm their work. In the seventeenth century, however, the mathematical logic and reasoning of scientists like Newton and Galileo presented new ideas and arguments that influenced the philosophers of the day. Copernicus, Galileo and Newton produced work that challenged the way society viewed its place in the order of nature and the universe (Smith 1972: 154). Smith claims that Newton and the first generation of his followers believed in a God that was a dynamic, ever-present force in the universe, who ran it according to His own laws (Smith 1972: 132). Newton left two million words in manuscripts dedicated to alchemical and theological pursuits (Smith 1972: 126).

Linnaeus, a parson's son, "took 1 Kings 17:8, 'and the word of the Lord came unto him', to be a Biblical prophecy of his binominal nomenclature" (Lindroth cited in Koerner 1996: 157). He viewed nature as a "prelapsian paradise" that contained perfectly balanced natural "productions for complete and complex economy" (Koerner 1996: 156). The idea of a God that created a universe that was arranged in accordance with a divine plan was central to Linnaeus's system of categorisation and his goal was to discover the structure behind what appeared to be a chaotic universe by developing a system that would reveal the inherent order that God intended for the universe (Slaughter 1989: 56). Many modernist philosophers towards the end of the seventeenth century reflected this ideal and academic Susan Pearce reiterates this sentiment – "investigators perceived themselves as approaching the mind of God" (Pearce 1985: 110). The backbone of some scientific ideas was therefore religious and was coupled with the

methodology of binominal nomenclature. Academic Ben Waggoner quotes from Linnaeus's *Systema Naturae* (1735):

> As he wrote in the preface to a late edition of *Systema Naturae*: *Creationis telluris est gloria Dei ex opere Naturae per Hominem solum* – 'The Earth's creation is the glory of God, as seen from the works of Nature by Man alone. The study of nature would reveal the Divine Order of God's creation, and it was the naturalist's task to construct a "natural classification" that would reveal this Order in the universe' (Linnaeus cited in Waggoner 2000: www.ucmp.berkeley.edu/history/linnaeus.html).

Linnaeus does not represent an isolated example of this line of thought. His ideas are mirrored by Goethe's approach to his studies of "nature". In his essay *Goethe's vision of science* (1983) scientific historian Eric Forbes outlines Goethe's approach:

> Goethe's belief in the continuity, organic and divine unity of nature (with man an essential element in it) was moulded by the philosophy of Spinoza and his reading of the German edition of *Contemplation de la nature by Charles Bonnet* (1783) where the implications of the Chain of Being concept are explicitly developed. Instead of a unilinear hierarchy of Being, however, Goethe envisaged it as 'holistic', with each organic whole contained within another that was larger than itself. His constant quest for wholeness and continuity in nature, and acceptance of this hierarchical principle, place him in the Neo-Platonic tradition of European thought (Forbes 1989: 9–10).

Goethe emulates Bacon's method of examining a multitude of instances to find the quality that they all share and only then formulating a general definition of that quality. Goethe's approach found a sympathetic ear in the German Romantic movement because many of the alignment of his ideas with theirs, specifically their reaction to the Newtonian mechanistic world-view.

Although, as I have outlined, the natural philosophers were lead by practical considerations, they were also fundamentally influenced by their personal religious convictions and supported by the ideals of the time. The Church played a strong role in dictating to people the "correct" way of living according to God's doctrine and these teachings were threatened by some ideas generated by natural philosophers. Those that challenged the doctrine of the Church, like Galileo for example, were dealt with severely. There are possibly two reasons for this: firstly, the Humanists were deeply religious; and secondly, the Church was heavy-handed in dealing out punishment to those that dared to challenge its doctrine. Religious and socio-political factors cannot be underestimated and played a role in determining how scientists, and the artists who worked with them, thought and operated in the world. The age of Humanism was gaining momentum, and the confidence to challenge the awesome power of the Church was growing and irrevocably changing the way people thought about their place in the universe:

> On a political level, the growth of a new, mercantile class, free from the stifling authority of the Church, heralded the birth of the modern Nation State. Humanism replaced the vertical hierarchies of feudalism and theocracy with the horizontal fraternity of increasingly more democratic political practices (Van Robbroeck 2006: 34).

The Church influenced the way in which natural philosophy developed, even though the age of Enlightenment was gaining momentum. The social factors that determined the progress of science from this point on in history were strong and the realm of rational understanding was restricted to an elite, educated group.

John Locke (1632–1704) was an influential political theorist and rejected the concept of divine right in his *Two treatises of government* (1689), claiming instead that government should be accountable to the people and serve their interests. He rejected the nobility's and the Church's right to rule by decree, opting instead for a system of empirical approach to government. Scientific historian Alan Smith claims that Locke's ideas were highly influential in eighteenth–century Europe and that:

> He was the ancestor of much of the rationalism which characterised the political thought of the *philosophes* and rejected the inherited and seemingly unreasonable powers and privileges of kings, clergy and nobility in favour of an empirical approach to the problems of government (Smith 1977: 179–80).

There was also a move towards the rationalisation of understanding at the expense of superstitious beliefs. Smith explains:

> Scientific ideas at the turn of the seventeenth century, with their stress on the need for rational explanations, led to a rejection of belief in concepts, such as miracles, witchcraft and astrology, which could not be explained in scientific terms and to the weakening of the belief of man, educated men in the traditional doctrines of Christianity. The new scientific ideas were spread by the publications of learned societies and by the increasing number of scientific books which were so avidly read by the educated members of western European society during the seventeenth century (Smith 1977: 176).

The "new scientific ideas" bred a sceptical outlook in the minds of the literate. This precipitated the rejection of mystical explanations of natural phenomenon and challenged the doctrines of the Church. "Bacon also agreed with many other seventeenth–century natural philosophers that the uninstructed senses were apt to deceive and that the senses needed to be methodically disciplined if they were to yield the authentic factual stuff philosophical reason could work on" (Shapin: 1998: 93). Their Christian beliefs, however, did not deter natural philosophers from making socially influenced judgments about *who* could be relied upon to make accurate observations about nature.

"Bacon was far from alone in wholly accepting that before the "Fall" Adam had possessed "pure and uncorrupted natural knowledge", the power that allowed him to give creatures their proper names. Galileo maintained that Solomon and Moses "knew the constitution of the universe perfectly" (Shapin 1998: 74). Newton belonged to a sect and believed "there might be a chain of specially endowed individuals through whom the pure and powerful ancient wisdom had been handed down intact, both intimating that they themselves might be present-day members of this lineage" (Shapin 1998: 74). Christianity held that God had written two scriptures, the first being the bible and the second being nature's book. "The Protestant Reformation of the sixteenth century laid special stress on the desirability of each Christian's having direct

engagement with Scripture, not relying on the interpretations of priests and popes, and the invention of printing with movable type in the 1450s made the injunction to read the Bible for oneself more practically realisable" (Shapin 1998: 77).

The study of "nature's book"

Bacon, Descartes and Newton were instrumental in laying foundational rules aimed at disciplining the production of knowledge. Direct sense experience was encouraged and was favoured because of mounting scepticism of the previously hallowed "ancient texts":

> So experience was to be welcomed by this reformed natural philosophy as a powerful means of supplanting traditional practice, but experience reports had to be carefully monitored to ensure that they were genuine. The house of natural philosophy was indeed to be opened up, but entrance to its interior rooms was to be vigilantly controlled. And though several modern practitioners proffered explicit rules for evaluating experience reports, it needs to be stressed that formal methodology was far less relevant here than the mobilisation of everyday social knowledge. Most practitioners seemed to know the visible signs of a trustworthy report and a trustworthy person without having the grounds of trustworthiness formally spelled out (Shapin 1998: 88).

The study of "nature" was related to direct-sense experience, however the field of botany developed in a way that the principal "texts" used to examine "nature" were managed, restricted and constructed to fit in with the botanists preconception of "nature". Different frameworks were established to understand "nature" despite the anomaly present in this premise as Jardine and Spary say: "There is no "natural" conception of nature, no stable inventory of the products of nature, and no universal register of questions timelessly posed by nature" (Jardine & Spary 1996: 12). This points to the "falseness" of the botanical pursuit and that it is a construct of "man".

The frameworks and systems developed by natural philosophers reveal more about the social locations of botany than they do about plants *per se*. Access to field sketches, herbarium sheets and botanists' journals that formed part of the observational methods that enabled natural philosophers to understand and quantify "nature" were strictly controlled. They often provided the only, albeit removed, link to "nature" that guided the natural philosophers in their studies of "nature". Field sketches done on the spot and taken from "nature" were deemed very important records of "nature" by the natural philosophers because these provided "true" depictions of "nature". Philosophers of the Enlightenment and the "scientific revolution" viewed the observations of the writers of the "ancient texts" with scepticism:

> In principle, therefore, the moderns' recommendation was clear: obtain experience yourself; mind not words nor traditional authority but things. Experience was formed into the foundation of proper scientific knowledge, and experience was to discipline theorising about how nature in general worked (Shapin 1998: 82).

Yet the problem prevailed of how to capture the essence of a plant. Luca Ghini (c. 1490–1556) invented the art of pressing plants onto paper sheets and he encouraged his students to paste or

sew specimens into books for future reference. This, however, did not overcome the problem of how to retain the colour of a bloom. Many specimens died in transit before they got to their destinations, and this made the commissioning of artworks vital. The field sketches were intended to allude to reality and attempted to be a convincing facsimile of "nature". As the editors of *Cultures of natural history* (1996), Jardine and Spary explain: "The more engaging and convincing the images, the more the viewer is led to take on trust the reliability and authority of scientists and their technologies" (1996: 12). Yet when an artist is employed to do a task set by a botanist the botanist has particular needs in mind. The artist then brings his/her own sensibility to play in the interpretation of the botanist's needs and in how the plant is replicated from "nature". Beliefs and social conditioning control the senses, and these come to bear in the making of a particular image.

Regulating the senses

The question of how to gather reliable information was much debated among natural philosophers in the period of study. "Authentic experiences" had to be separated from superstition and "old wives' fables" (Shapin 1998: 88). Added to this was the problem of inventing ways to train and regulate the senses, so as not to be misled by personal observation. This may account for why plants were the primary focus of many seventeenth–century studies of "nature" – their diversity, coupled with their visible similarities make them amenable to taxonomic analysis. Slaughter elaborates:

> The isolation of these variables or the decomposition of the organism into these elements permits organic form to be reconstituted or retranslated into a linear language, into a series of successively ordered elements which constitute a taxonomy. Once this is done, they can be represented in natural language and given names (Slaughter 1998: 9).

The profound reliance on the senses for making accurate observations of the natural world is questionable. To what degree could a person's senses be relied upon to perceive correctly? Humanist scholars recognised that the ancient texts had been altered in the medieval era through neglect or the desire to impress their own conception of the world on the writings of the ancients. There was a drive in the Renaissance to restore the ancient Greek and Latin texts to their former state, one untainted by the translations made in the intervening thousand years of darkness (the Medieval era). However, the Renaissance philosophers began to discover discrepancies in these "texts" through the direct experience of observing phenomenon with their own eyes. "In seventeenth century England, self-styled "moderns" arrayed themselves against contemporary "ancients". Boyle wrote that he did not trust every writer's quotations from other authors: many times, on inspection, the quotation was incorrect, and sometimes it had been willfully fabricated" (Shapin 1998: 76). The more polemical voices among the moderns reckoned that nothing ought to be preserved from traditional practices and that the textual legacy of ancient learning was little more than a testament to human capacity for delusion and human gullibility in being imposed on by authority" (Shapin 1998: 66). Foucault says in *Discipline and punish* (1977):

> One is no doubt right to pose the Aristotelian problem: is science of the individual possible and legitimate? ...To this simple question of fact, one must no doubt give answer lacking in 'nobility': one should look into these procedures of writing and registration, one should look into the mechanisms of examination, into the formation of the mechanisms of discipline, and of a new type of power over bodies (Foucault cited in Rainbow 1984: 202–3).

The fallibility of an artist is inevitable; one is always only creating a subjective impression of reality that is limited by skill and ability to manipulate one's materials. Not even a photograph can faithfully capture a plant that exists in three dimensions. The rhetoric produced at the time cautioned against the use of "the uninstructed senses" to understand "nature". Shapin says: "The ancients had not supplemented their verbal descriptions with pictures – worrying that the human artist could not copy any given plant with the requisite accuracy or capture the seasonal variations in their appearance" (1998: 76). The rejection of the existing natural philosophical traditions was justified by the perceived weakness caused by the fact that they were based on human textual authority and not on directly observed sense experience (Shapin 1998: 66–68). The natural philosophers stressed the need to discipline the senses despite their insistence on directly observed data. The question of how to train the senses became question of education. The English natural philosopher John Wilkins (1614–1672), and the physician Sir Thomas Browne (1605–82), for example, did not mince their words about how unreliable they considered non-scientific people's observations. Shapin cites Wilkins and Browne:

> You may as soon persuade some country peasant that the moon is made of green-cheese, (as we say) as that it is bigger than his cart-wheel, since both seem equally to contradict his sight, and he has not reason enough to lead him farther than his senses (1998: 94).

Browne observed in *Pseudodoxia epidemica* (1646) that the senses needed to be guided by knowledge, and the common people were:

> [B]ad discerners of verity. Their understanding is so feeble in the discernment of falsities, and averting the errors of reason, that it submitteth unto the fallacies of sense, and is unable to rectify the error of its sensations. That is to say, for such practitioners the disciplining of experience importantly implicated a map of the social order (1998: 94).

The issue of education and social status is central to the examples cited in Wilkins and Browne. The inference that peasants cannot know "nature" in the controlled and regulated the way that natural philosophers did was clearly socially biased. It seems peculiar that the natural philosophers assumed that an educated individual's ability to reach deductions about "nature" based on their own senses was more reliable than those of a peasant – especially in the light of the influence the Church had on their thinking, as previously discussed.

Conclusion

The "scientific" discourse introduced by Linnaeus and his contemporaries can be connected to a regime of power – one that asserts the privileges of the educated/rich over those of the uneducated/poor. Those that have had the privilege of an education are deemed reliable

enough to make accurate observations of "nature". The poor and uneducated were totally excluded from the realm of philosophy. These attitudes are born from embedded social prejudices. Foucault sums it up:

> Whence all the chimeras of the new humanisms, all the facile solutions of an anthropology understood as a universal reflection on man, half-empirical, half-philosophical. It is comforting, however, and a source of profound relief to think that man is only a recent invention, a figure not yet two centuries old, a new wrinkle in our knowledge, and that he will disappear again as soon as that knowledge has discovered a new form (Foucault 1970: xxiii).

Botanical art emerged as one of the discursive formations of botany in the "scientific revolution". The illustrations served as a "text" that enabled natural philosophers to order their thinking about "nature". Frameworks were established to study nature in and the question of the reliability of the senses was much debated. Ideas were influenced by religious convictions and social practices that disenfranchised the poor and uneducated. This arguably affects the scientific empiricism because these acts of exclusion restricted the development of their understanding. The production of knowledge was limited to an elite group. Plant collectors embarked on voyages of discovery to bring back specimens from the "new worlds".

Chapter 2: Travel accounts, journals, manuscripts and the voyages of discovery: a legitamising force for science

Preserving and bringing back specimens in good health was difficult and so the travel journal was endorsed as a tool for scientific investigation. The travel journal became an important record of the personal experiences as well as the scientific observations of individual travellers. They represented the most vital way in which information about the "new worlds" was disseminated into European culture. Writers unrealistically strove for accuracy and attempted to free themselves from personal bias in recording their observations. Travel journals were published in to meet the public's taste for tales of adventure. "The account was written mainly not as a scientific report, but in the popular genre of survival literature" (Pratt: 1992: 20). These accounts hence not only appealed to natural philosophers, but also enjoyed a much wider popularity. Author Werner Muensterberger describes in *Collecting: An unruly passion, psychological perspectives* (1994) how the prevailing atmosphere of adventure fuelled the desire for exotic things:

> It is quite obvious that the early humanists' less erudite contemporaries welcomed spellbinding tales about distant lands and hitherto unknown goods and customs. Curiosity and inquisitiveness went hand in hand with the increasingly impressive mercantile ventures, originally led by Venetian and Genoese traders, although rather soon followed by the Portuguese, Spaniards, Dutch, and English (Muensterberger 1994: 187).

In the eighteenth century Europe's governments were becoming increasingly imperialist (Spary 1996: 194). Monarchs and ministers were beginning to recognise the potential revenue that the "new" species of animals and plants could generate to increase both national and personal wealth. "The Dutch East India Company was a trading concern vitally interested in paying its shareholders handsome dividends" (Smith 1952: 7). Academic Mary Pratt sums up the effects of the accounts generated from travel into the new worlds:

> In the second half of the eighteenth century, scientific exploration was to become a magnet for the energies and resources of intricate alliances of intellectual and commercial elites all over Europe. Equally important, scientific exploration was to become a focus of intense public interest, and a source of some of the most powerful ideational and ideological apparatuses through which European citizenries related themselves to other parts of the world" (Pratt 1992: 23).

These accounts made a discernable contribution towards the "othering" of the "new worlds", and this is discussed in this Chapter.

Scientific interests versus financial gain: two opposing forces?

In the seventeenth and eighteenth centuries the voyages of exploration engaged many travellers in scientific endeavour. Men like Banks, Sparrman, Masson, Thunberg, Gordon, LeVaillant and Linnaeus risked their lives in order to bring to Europe the empirical evidence of the "new worlds" that was required to expand scientific knowledge. The pressure was on to

discover and name curiosities of every kind. Linnaeus was interested in expanding the popularity of his taxonomic system and was to this end instrumental in arranging to have nineteen of his students sent out on world-wide voyages of trade and exploration. [2] Historian Lisbet Koerner in *Carl Linnaeus in his time and place* (1994) says Linnaeus solicited funds for their travel from the Levant, Greenland; the East India companies; the bureau of manufacturers; the Academy of Sciences, Lund and Uppsala Universities; the Estates; the cabinet ministers; the court; as well as from individual patrons (Koerner 1996: 151). Mary Pratt says "[a]s his [Linnaeus's] taxonomy took hold throughout Europe in the second half of the century, his 'disciples' (for so they called themselves) fanned out by the dozens across the globe" (Pratt: 1992: 25). His students were given free passage aboard the Company's vessels and hence a large scale collecting, annotating, preserving and recording exercise was launched. All their findings were written up in travel journals that became the basis for the implementation of Linnaeus's taxonomic ideas. These journals also contained within their pages, the hidden narratives that "othered" the "new worlds".

The natural philosophers and plant hunters had begun to create the self-legitimating discourse of taxonomy. The "new" natural phenomena being introduced to the European knowledge system needed to be named, categorised and classified. Barbara Stafford sums up:

> The eighteenth century undertook and largely achieved a heroically vast description of the sensible universe that moved from discovery to discovery. It is against this background that the expression 'the taste for discovery' becomes comprehensible. Between 1660 and 1800, collections of voyages were very popular. By the middle of the eighteenth century the great voyages of study, which undertook and largely achieved a vast description of the sensible universe, were underway (1984: 11).

In the later part of the eighteenth century there is more of a distinction made between the types of travel journals that were produced. William Burchell and Willaim Paterson were botanist-travellers who had scientific endeavour close to their hearts. Their approach was different to that of LeVaillant who collected widely for the progress of natural philosophy but also had more altruistic aims at heart. Hendrik Van Rheede tot Drakenstein (1636–1691) wanted to find remedies to help combat the exotic diseases to help the Dutch survive in these remote countries. Natural philosophers tended to feel that their pursuits were transcended by the greedy commercial aspirations of privately commissioned collectors. Stafford highlights the contrast in attitude between the collectors interested in travel for financial gain, as opposed to those in pursuit of scientific knowledge:

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[2] Perhaps his most famous student, Daniel Solander, was the naturalist on Captain James Cook's first round-the-world voyage, and brought back the first plant collections from Australia and the South Pacific to Europe. He also stopped in South Africa but was too ill to make any significant collections here. Anders Sparrman, another of Linnaeus's students, was a botanist on Cook's second voyage and also wrote a detailed account of his experiences in South Africa. Carl Peter Thunberg was the first Western naturalist to visit Japan in over a century and he also collected prolifically at the Cape. Some of Linnaeus's other students travelled to South America, south-east Asia, Africa, and the Middle East (Koerner 1996: 151).

> In contrast with the situation among privateers, gentleman antiquarians, or seekers solely after the picturesque, international collaboration was a powerful motivation for the scientific explorers, even in a period of strong European rivalry.
>
> Science, as a transcendent interest, often was set above narrowly commercial, military, or colonial exploitation... The 'veil of secrecy' that in former times had been drawn over the results of these enterprises had thwarted the propagation of useful information 'to every European nation; and indeed, to every nation however remote', as Cook noted (Cook cited in Stafford 1984: 24).

The author of *Botanists at the Cape,* Verduyn den Boer reiterates, how botanists "solicited" the co-operation of the government for their endeavours:

> I think it will be evident how from 1640 to 1770 a continual exodus of Cape plants was taking place, for the most part through the public of the leading citizens of Amsterdam and Leiden, who were anxious to enrich their own and the public gardens of their native cities, and by perpetual solicitations kept the Dutch government of the Cape settlement interested in their horticultural work (1929: 34).

Koerner maintains that Linnaeus's collecting voyages were in part undertaken for economic reasons, and that his students experimented with acclimatising cash crops to grow "even on the Arctic tundra" (Koerner 1996: 151) Stafford provides insight into this phenomenon:

> The entire age was dominated by travellers, hence the aptness of Michel Foucault's comment that the two fundamental perceptual structures of the eighteenth century were a child's being born blind and later receiving sight and a foreign observer's shock at being thrust into an unknown country. These primal experiences alter the processes of vision in a way that is possible only when a fundamental discovery is made (1984: 20).

Governments improved policies that uplifted the status of natural philosophers and afforded them the opportunity to fill their gardens with new plants (Spary 1996: 179). English naturalist and botanist Banks, who founded Kew gardens, had risen to the upper echelons of elite society. Natural philosophers began to enjoy unique positions as "mediators between nature and society" (Spary 1996: 194). They began to make claims about the ways in which women and other social groups ought to behave and all of these claims were backed up with what they considered to be sound empirical evidence. Artist and academic Keith Dietrich raises valid concerns about Africa being depicted as the "other" by Europeans in his thesis *Of salvation and civilization: The image of indigenous southern Africa in European travel illustration between the sixteenth and nineteenth centuries* (1993):

> These travel accounts and their accompanying illustrations highlight a number of significant issues which reveal the complexity in European thinking with respect to observing 'primitive' societies. The Europeans who visited this country had mostly been well educated, and before arriving at the Cape had already formed certain ideas regarding the country and societies that they were to confront. These ideas were largely determined by the social, political, economic, religious, and philosophical views that prevailed throughout their respective educational experiences. It must also be pointed out that different and sometimes contradictory ideologies coexisted in European thinking regarding

> primitive and civilized societies and values, which are reflected in these accounts. Furthermore, these ideas very often varied according to the nationalities of the visitors. There were often remarkable differences of attitude to Africa between Portuguese, Dutch, English, German, and French visitors (1995: 6–7).

The exploration of the world resulted in the growth of botanical knowledge. The specimens coming into Europe fuelled a desire for the "exotic" and audiences flocked to see the newest curiosities. The dark, hidden side of this era of zealous scientific activity was the subjugation of indigenous knowledge. The effect on the consciousness of Europeans must have been profound. "Journalism and narrative travel accounts, however, were essential mediators between the scientific network and a larger European public. They were the agents in legitimating scientific authority..." (Pratt 1992: 29). Borders were expanded, bringing endless new possibilities not only for scientific research, but also for economies. Stafford sites Brosse and outlines the psychology surrounding these voyages:

> The preface to De Brosses's monumental *Histoire des navigations aux terres australes* (1756) sets forth what must surely have appeared a shocking program. He bluntly states that an expedition must have no other goal than that of being successful, and that not until the voyage is a total success should anyone be occupied with gainful activities... Then follows the crucial passage: 'Too much haste in enjoying the fruit of one's projects often leads only to their failure. In the beginning let us think of nothing but geography, of the pure desire to discover, of the acquiring of new lands and novel inhabitants for the universe ...' (De Brosse cited in Stafford 1984: 19–20).

Travel accounts that enjoyed popularity in the seventeenth and eighteenth centuries were underscored by racist and sexist paradigms, and they embodied the hegemony of colonialist perspectives and emperialist ambitions to control the production of knowledge.

Travel accounts as tools of science

There are several contributing factors as to why the use of travel accounts was endorsed by seventeenth–and eighteenth–century natural philosophers as being an acceptable tool for scientific investigation. In this relatively low-tech era it was difficult to preserve specimens, and travelling was often conducted under unfavourable conditions. Specimens were often damaged, lost at sea or simply never arrived intact in Europe. According to P. G. Jordaan's essay *François leVaillant's botanical paintings*: "when he [LeVaillant] returned to Cape Town from one of his excursions he had formed a very valuable collection... these plants, however, never reached their destination, as the vessel on which they had been dispatched perished at sea" (1973: 45).

The descriptions contained in travel accounts and the accompanying images were often the only form of primary observations of "nature" to reach the natural philosophers in Europe. Barbara Stafford in *Voyage into substance* (1984) outlines some of the ideals held by early "explorers" when writing their journals:

> The struggle to find an innocent mode of literary and visual expression that would convincingly do justice to the novelty of the material circumstances encountered is

Fig. 1. Engraver unknown, *Scagiosa hirsuta, foliis nervosis, subrotundis, floribus proliferis* (detail) (1738–39). Printed engraving on paper. (Burman 1738–39: 197; Fig. 3 *Tab. LXX11*).

Fig. 2. Engraver unknown, *Mesembryanthemum folio triangulari, gluco, saepe reflexo & aculeato, Bellidiflorum* (detail), (1738–39). Printed engraving on paper. (Burman 1738–39: 60; *Tab. XXV*).

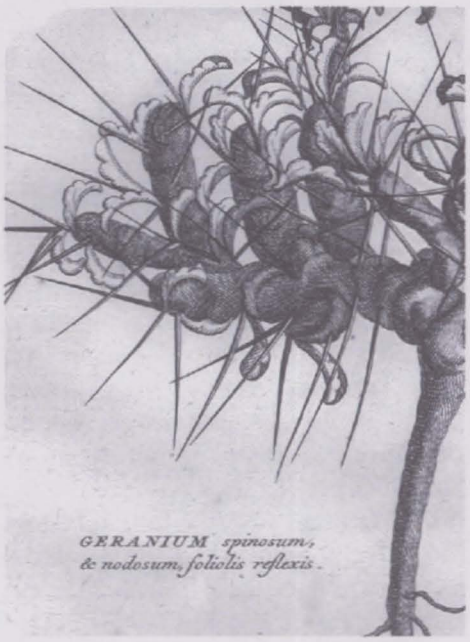

Fig. 3. Engraver unknown, *Geranium spinosium, & nodosum, foliolis reflexis* (detail) (1738–39). Printed engraving on paper. (Burman 1738–39: 87; *Tab. XXX1*).

A comparisson between these details of engravings taken from Burman's publication *Rariorum Africanarum plantrum decades* (1738–39) show the formal line work typical of eighteenth–century engravings. Engravings employ similar formal techniques and tools and tend to have a uniform look.

> discussed in the preface to every notable relation of a voyage of discovery published between the middle of the eighteenth century and the middle of the nineteenth. This wrestling with the problem of clear and meticulous articulation, and with the narrative ordering of details (particularly in the description of natural phenomena), finds nothing truly precursory in such variations on the genre as the 'imaginary' or extraordinary voyage and the 'travel lie' (Stafford 1984: 28).

Stafford alludes to some of the inherent problems that arise when considering the travel journal as a form of scientific investigation. She mentions the "travel lie" – many journals contained exaggerated or even blatantly falsified accounts of experiences and living things that the authors claimed to have observed.[3]

Many of the journals and accounts of travellers contained an inherent Eurocentric bias. Travellers credited themselves with having introduced amazing new natural phenomena to European knowledge but the items collected from "nature" reveal the cultural perspectives and personal tastes of the collector, and often had little to do with scientific endeavour.

Invention of printing: dissemination and access to ideas

While the advances in printing helped to disseminate ideas, printed books further abstracted "nature" by codifying it into a mechanical visual language that was easy to reproduce. Images of plants taken from sketches were mechanically reproduced for printing using etching and engraving. The printed images usually appeared in black and white and the printing process can thus be regarded as one more step towards codifying "nature". Furthermore the technique of engraving (see *Figs. 1a – 1c)* in the seventeenth century was very formalised and made all engraved illustrations have a similar look, flattening the image into a codified visual language. The printed works deepened the level of abstraction of "nature" that was manipulated for the purposes of scientific study. These images were often iconotypes (first published description of a species) that had vital errors transcripted into them (see Chapter 3). Books that were consulted by botanists held deeply codified impressions of plants that had little to do with the living organism. These illustrations became part of the artificial language schemes of botany. Slaughter elaborates on this theme:

> We would expect that cognitive changes brought on by these changes in media not only affect the study of nature but also affect language – attitudes towards language and the use of language. This peculiar conjunction of scientific and linguistic activity is what we find in the case of the artificial language schemes. This line of thinking suggests further that the primary event or change, brought about by writing and reinforced on a wide scale with printing and the increase in literacy made possible by printing, is 'decontextualisation'. This is the separation of language (speech, discourse) from a living context, a context of ongoing activity in which speech is one of many simultaneously occurring events. Writing separates speech from a sequence of time where speech is transitory, and changes language into something static. It separates messages from face-to-face interchanges where

[3] Vernon Forbes has written a detailed thesis *Pioneer travellers of South Africa: A geographical commentary upon routes, records, observations and opinions of travellers at the Cape, 1750–1800* that provides an in-depth study of the many geographical discrepancies contained in the main travel accounts and maps produced about South Africa.

> personal considerations are negotiated at the same time as information is being delivered. ...It separates speech from a scene in which all sensory apparatus is (potentially) engaged, where all the human faculties of the participants are in use (Slaughter 1998: 39–40).

The printed words and images assumed some kind of authority and became a way in which knowledge could be legitimated as embodying the "truth".

In the early 1730s Leiden and Amsterdam were centres of book production and trade.[4] It made sense for Linnaeus to go there to complete his training and to propagate his ideas to a wider audience. In addition the main protagonists of Dutch botany Johannes Burman and Herman Boerhaave (1668–1738) who were leading taxonomy in the "discovery and description of the extra-European plant world" resided there (Stafleu 1971: 157). Linnaeus understood that once he had won the sanction of these leading Dutch botanists, his career would be on a winning track and their acceptance of his ideas would secure his status in the world of natural philosophy (Stafleu 1971: 157). Hence the success of Linnaeus's ideas can be partly attributed to the successful publication of his books. The advancements made in printing had other important consequences for Linnaeus. Koerner states it made his ideas accessible to a wider, although still elite audience:

> His [Linnaeus's] great reputation rested instead in the democtratising accessibility of his achievement. For the value of Linnaeus's classifications lay in their humdrum, everyday usefulness, for casual and serious users alike. In his guides and handbooks, and in the structure of his systems as such, Linnaeus lowered the educational and financial entrance fee to the studies of nature (1996: 145).

This however does not alter the fact that exposure to books was still limited to an elite group. Without the advances made in printing, the increasingly popular travel journals would never have been so widely disseminated, neither would literacy have improved. "These accounts covered every continent of the globe and by the end of the [eighteenth] century they were beginning to exercise a profound influence on the minds of Europeans, who became familiar with the ideas and customs of peoples, such as the Chinese who knew little of the classical civilizations of the ancient world or of Christianity" (Smith 1971: 174).

The improvements made in printing technology in the era went hand-in-hand with the advancement of scientific ideas. Books presented information in an abstract, sanitized version that was supposed to reflect "reality" but more often embodied specifically formulated ideas and intentions. Through books ideas could be shared, commented upon in an arena that was dislocated from "nature". Herein lies the birth of the "grand narrative" of botany.

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[4] "Leiden and Amsterdam were centres of book production and book trade, comparable only with Leipzig and Paris. A book published by one of the main Dutch firms such as Theodoor Haak, Conrad Wishoff, or Samuel Luchtmans in Leiden, or Salomon Schouten in Amsterdam, would be well produced and widely distributed" (Stafleu 1971: 157).

The collectors, travellers and "explorers" to South Africa: a discussion of their journal writing

Journal writing included detailed visual and verbal descriptions of "nature" and was considered an important tool for "science". The botanical practices of collectors like Maria Sibylla Merian (1647–1717) and LeVaillant differed from those used by Masson and Sparrman, the latter two having been influenced by Linnaeus. Masson received his instructions from Banks, a student of Linnaeus. The later half of the eighteenth century showed a shift in the journals, these were aimed at being scientifically more accurate. Botanical librarian Mary Gunn states for example that Burchell is considered to be one of the most prolific and "scientific" collectors of his era because of the detailed notes he took in the field about the location, morphology and habitat of the plants he collected (Gunn & Codd 1981: 109). The fact that he included this information (where Sparrman, Masson and Gordon provided only scant details of this kind) reflects the developments within the field of botany. Botanists were beginning to realise the importance of collecting data about a plant's specific location in "nature" before it was removed as a specimen for study. I have chosen to compare a few journal writers specifically because they embody these different trends.

While plant collecting was a peripheral activity of the voyages of discovery it had far-reaching financial benefits for both the plant collectors and the scientists who commissioned them.[5] In 1760 Kew gardens was laid out and put under the care of Banks and it was arranged according to the Linnaean system of categorisation. His vision for the garden was as a "the great exchange house of the Empire" (Cameron cited in Stafleu 1971: 231). Stafleu says: "This great conception far surpassed that of a merely curious collection of exotic plants; Kew Gardens was to play a role in the development of the Empire through the introduction of useful plants from all corners of the globe, for the benefit of the home country as well as of the colonial settlements" (1971: 231). Academic Stephen Weltz adds: "Horticulturalists and botanists were dispatched there [the Cape of Good Hope] by wealthy patrons to search for species which would not only enhance European gardens but also result in financial gain. The motives of these collectors included also the acquisition of personal recognition and prestige, and this lead to the publication of some of the finest examples of botanical art" (Weltz 2001: 8).

The styles that were employed for the writing of journals were as diverse as the personalities who wrote them. There were, however, distinct systems to which the various writers aspired.

Linnaeus: The question of style and the extent of his influence

LeVaillant's writing style and approach to botany is in stark contrast to the style propagated by Linnaeus. LeVaillant published several handbooks in which he condemned the use of

[5] The commercial hybridisation of *Pelargonium* was begun as early as the turn of the nineteenth century. A German company *Fischer Pelargonium* is making huge profits from the plant. *The plant hunters: two hundred years of adventure and discovery around the world* (1998) edited by T. Musgrave, C. Gardner and W. Musgrave includes a comprehensive account of the benefits that plant transfers had for Great Britain's economy and how they contributed to the building of the British empire.

embellished language designed to have emotional impact. "*Philosophia botanica* bans tropes such as synecdoche, metaphor, and irony" (Koerner 1996: 155). Linnaeus was striving to find a form of expression that would appear to be without bias. Linnaeus's call for unadorned rhetoric related to his perception of himself as a "Gothic" moralist who opposed all French courtly behaviour (read as his rival Comte de Buffon).

> Buffon was famous for his opposition, on philosophical grounds, to the classifications as arbitrary and artificial procedure, but he professed a belief in a rigorous approach to nomenclature. He was fully aware that the observations in the field were essential and relied on a network of travellers and explorers throughout the world for information on the bird species he described in his *Histore naturelle des Oiseaux* (Rookmaker, Mundy, Gunn & Spary 2004: 163).

Again a certain mind-set is implied – it is difficult to accept that a scientist remains uninfluenced by their personal belief system. A hilarious historical example illustrates my point: Linnaeus and Buffon were fiercely opposed to each other, each vying to have their system of categorisation acknowledged and Linnaeus expressed his contempt for Buffon by naming a weed after him. The weed occurs in the Mediterranean and Europe and has the generic name *Bufonia L.* (Caryophyllaceae). According to botanist Ted Oliver: "The allegation that Linnaeus deliberately altered the generic name from *Buffonia*, commemorating Buffon, as a malicious pun on *bufo* (meaning toad) is said to be unfounded. Well I am not sure about that; it surely could not have been a typo! Linnaeus was known to have wielded his pen in getting back at opponents of his new sexual system of classification. The above seems to be a nice example" (Oliver. T, personal correspondence, 31 October 2006).

In her essay *Carl Linnaeus in his time and place* (1996) Koerner points out that Linnaeus wanted both "lay and learned" people to use his system, his handbooks were written in succinct Latin and he encouraged vernacular translations of them (1996: 147). While Linnaeus may have been reaching out to new audiences, not just those within the field of botany, not many people could read and even fewer could actually afford to buy books. To people without a decent education the discourse of botany remained unattainable. Bacon stated: "[T]he ill and unfit choice of words wonderfully obstructs the understanding" (Smith 1972: 157). He identified the need for plain and precise prose, especially in scientific exposition. *The Royal Society* was founded during the Restoration. Its members took up Bacon's point about the need for a plain prose style (Smith 1972: 157). Thomas Sprat, the Society's first historian, wrote in 1667 that:

> There is one thing more about which the Society has been most solicitous, and that is the manner of their discourse: which, unless they had been only watchful to keep in due temper, the whole spirit and vigour of their design had been soon eaten out by the luxury and redundance of speech...
>
> And, in a few words, I dare say that of all the studies of men nothing may be sooner attained than this vicious abundance of phrase, this trick of metaphors, this volubility of tongue which makes so great a noise in the world.... It will suffice my present purpose to point out what has been done by the Royal Society towards the correcting of excesses in natural philosophy, to which it is of all others a most professed enemy.

> They have, therefore, been most vigorous in putting in execution the only remedy that can be found for this extravagance, and that has been a constant resolution to reject all amplification, digressions, and swellings of style.... They have exacted from all their members a close, naked, natural way of speaking, positive expressions, clear senses (Sprat cited in Smith 1972: 157–8).

The following is an extract from Gordon's journal showing his attempt to write in an unmediated style. This does not make for scintillating reading – each day compass readings and weather conditions are recorded, and one seldom gets a glimpse of the author as a human being. The example demonstrates his obsessive noting of details in an effort towards scientific episteme. Yet the excerpt reveals his negative bias towards the indigenous knowledge and naming system, by saying the *dasje* is incorrectly named:

> Shot a bergrot [mountain rat] today which is wrongly called a *dasje* in this country. It has teeth of a rat, and a tail which is not visible but can be just be felt. It has four toes in front, the smallest of which is hardly visible, and three behind. The shape of its back foot is very like that of a human being. It lives on herbs and on grass and is good eating. It has four teats. Pelt brown and soft (Cullinan 1992: 74).

Stafford cites from Sparrman's journal *A voyage to the Cape of Good Hope, towards the Antarctic Polar Circle, and round the world; but chiefly into the country of the "Hottentots" and "Caffres" from the Year 1772 to 1776* (1975) where he describes the way in which audiences received these accounts:

> Andrew [sic] Sparrman, the Swedish naturalist who accompanied Cook on his first tour of the South Seas, affirms this taste for great scientific voyages when he claims their accounts had never been more popular than in 1777. Sparrman's acknowledgment of the 'avidity' with which these relations were bought up and the 'eagerness' with which they were read furnish undeniable proof of the era's 'turn for experiment' and its 'disposition to enquire' (Sparrman cited in Stafford 1984: 20).

Gordon was a soldier, traveller, naturalist and linguist in the employ of the Dutch East India Company. He travelled with both Masson and Thunberg and he named the Orange River after the Prince of Orange. He was promoted to commandant of the Dutch Garrison when he was stationed at the Cape in 1780, until he committed suicide. He never published his journals and illustrations and the originals are housed in the Rijks Museum in Amsterdam (Gunn & Codd 1981: 170). However, he was outspoken in his criticism of other people's writing, particularly Sparrman's first published volume of his journey to South Africa. I quote verbatim: "This volume is thus finished and it is really a shame that men how mighth [sic] simply instruct the world and get credit eneog [sic] should out of vanity tell such a number of lies and make such a compound of all the stories they greedily catch at to make make [sic] a large book. Covering their ignorance and what they never saw with learned systematical names" (Gordon cited in Cullinan 1992: 166). Gordon claims that Sparrman did not have experience of some things he wrote about, and gives examples.[6] Cullinan says that Masson, Paterson, Boos, Scholl and LeVaillant

[6] See Patrick Cullinan's *Robert Jacob Gordon 1743–1795* (1992). Struik Winchester. Cape Town. Pages 166–167.

Fig. 4a. Artist unknown. *The flowers of Aloe dichotoma, quiver tree* (1789). Hand-coloured engraving, 210 x 280mm. (Paterson 1789: *Plate 6*).

Fig. 4b. Artist unknown, *The flowers of Aloe dichotoma, quiver tree* (*1781–1784*). Watercolour on paper, 473 x 309 mm. Collection: *François LeVaillant, traveller in South Africa and his collection of 165 watercolour paintings*, Library of Parliament, Cape Town. (LeVaillant 1973: *Plate 145*, Vol. 2).

recorded their debt to Gordon for his aid, and also published some of his material without acknowledging him (Cullinan 1992: 188). Masson certainly does not do so in his *Stapeliae Novae* that contains illustrations that appear to be based on Gordon's work (see Chapter 3). The *Aloe dichotoma* pictured in Paterson's journal (*Fig. 4a*) appears to be sourced from Gordon or LeVaillant (*Fig. 4b*). *Fig. 4b* is an example of a painting from the recently discovered LeVaillant collection of 165 watercolour paintings held by the Library of Parliament. These examples, of which there are many, show the complexity of relations between the botanists and explorers. It is impossible to say whether Gordon or LeVaillant provided Paterson's source for the engraving, he knew Gordon but I am not aware of a similar drawing being part of the *Gordon Atlas*. The very fact that this kind of information was shared makes a mockery of the insistence of natural philosophers, like Hooke and Bacon, placed on "direct sense" experience.

LeVaillant: birds of a feather

LeVaillant was a French collector, explorer and ornithologist who sent to the Cape by the Dutch East India Company in 1781 and stayed in South Africa until 1784. LeVaillant was opposed to Linnaeus's taxonomic systems and specifically to the Latin names he prescribed. LeVaillant only gave the new species he discovered French names (the *Bataleur terathopius ecaudatus* retains the name assigned to it by LeVaillant).

LeVaillant's journals *New travels into the interior parts of Africa in the years 1783, 84 & 85* (three volumes) were peppered with accounts and descriptions of things that he did not observe himself, but were based on second-hand sources, or some say complete fantasy.[7] More importantly for this study though is the fact that LeVaillant also took pleasure in the local indigenous names of plants; he never subscribed to the use of scientific names. Rookmaker says LeVaillant berated the arrogance of those who refused to acknowledge local names (2004: 164–166). In *François leVaillant, traveller in South Africa and his collection of 165 watercolour paintings 1781–1784* (1973) Jordaan concurs: "No more than two specific names are given [to LeVaillant's botanical illustrations], and only one of the two of these *Aloe dichotoma* is correct. By contrast, 22 generic names are used in some 28 captions, and about 22 of these names would have been regarded as correct in 1770" (1973: 73). The illustration in *Fig. 6*, for example, from LeVaillant's published journal is given the non-scientific name *Melon-ribbed euphorbia*. LeVaillant found the information encoded in the local names helpful to identify a particular specimen in the field. "His strength lies in his field work, with its detailed observations, experiments, descriptions (which contain marvelous attention to detail) and notation of bird calls, and skill as a taxidermist" (Rookmaker 2004: 164). Jordaan says the local names LeVaillant used were generally learned from Cape Dutch farmers or *Khoikhoi* and many of these names survive in the Afrikaans language (1973: 47).

[7] "Academic Vernon Forbes criticised LeVaillant's work for the many inaccuracies and distortions designed to show him in a good light. It appears that some of the writing is based on hearsay rather than personal observation" (Gunn & Codd 1981: 225).

Fig. 5. Artist unknown, *Euphorbia melonformis* (c. 1775). Watercolour and pencil. Collection: *A collection of drawings by Francis Masson,* Botany Library, Natural History Museum, London.

Fig. 6. Engraver unknown, *Melon-ribbed euphorbia* (1796). Printed engraving on paper, 125 x 200mm.
(LeVaillant 1796: 22; *Plate XIV,* Vol. 3).

There has been a lot of criticism of LeVaillant and the methods he used but as literary critic Ian Glenn points out, some contemporary criticism of LeVaillant has been based on politically slanted English translations of his journal (Glenn n.d.: 87).[8] I rely on historians L. C. Rookmaker who is considered a contemporary expert on LeVaillant and Vernon Forbes, who use the original French or English translations. LeVaillant published his journals quite a number of years after his journeys, relying on his travel notes that have not been found subsequently. Stafford cites Van Tieghem's *Le sentiment de la nature* and alludes to the style which characterises LeVaillant's published journals:

> Despite the attention it seemed to pay to nature, the ornamented *style touriste* or picturesque style, whose latest florescence came in the 1770s, was inadequate for an art whose purpose was instrumentality and the duplication of material existence. These collections of unfocused evocations, stressing the poetic qualities of mountains, rivers, forests, and lakes, served for the most part as private sources of amusement. What could be more disconcerting to the pursuer of the scenic than the demanding procedure of gathering facts? (Stafford 1984: 26).

LeVaillant has been harshly criticised by academics for inaccuracies within his epic work *Histore naturelle des Oiseaux d'Afrique* (1790) in six volumes, because it includes birds that do not occur in Southern Africa. Also according to Gunn and Codd, an unscrupulous Parisian taxidermist in his employ "cut and pasted" make-believe bird specimens together through clever and creative taxidermy, some of these were published as being "real" specimens. Gunn and Codd say these inclusions went unchecked by LeVaillant, implying that he was either careless in overseeing the preparations for his books (1981: 225) or otherwise, as Rookmaker concludes, he willfully included these fantastical specimens to excite interest (2004: 2–3). He could also have wanted to create the impression that he travelled further than he actually did by including specimens beyond South African "explored" borders. Historian P. G. Jordaan claims that some plant species included in a recently discovered collection of 165 drawings[9] do not occur in the regions he travelled to (Gunn & Codd 1981: 225).

If one compares the two renditions of *Euphorbia melonformis* in *Fig. 5* and *Fig. 6* the first comes from Masson's collection of sketches in the Natural History Museum, London and the second is an engraving from LeVaillant's book *New travels into the interior parts of Africa in the years 1783, 84 & 85*. It is remarkable to notice in LeVaillant's published version of this plant the exaggerations and distortions – for example the roots and the addition of the bulbous bits at the base of the plant and oddly protruding flowers. LeVaillant's illustration looks strange and exotic compared to the timid, tame little plant depicted in the Masson watercolour sketch. These distortions give credence to Rookmaker's notion that LeVaillant was an exaggerator and did things to please his audiences, and as I postulate, to sell books. However, against this backdrop of criticism, Rookmaker still makes a convincing argument for the validity of LeVaillant's work:

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[8] Glenn claims that the criticism of LeVaillant by Michéle Duchet and Mary Louise Pratt is based on the highly censored right wing colonialist version of the text produced in France in the 1930s (Glenn n.d.: 87).

[9] These appeared in 1963 in a Sotherby's auction and were published in 1973 in two volumes entitled: *François leVaillant, traveller in South Africa and his collection of 165 watercolour paintings 1781–1784*, published by the Library of Parliament, Cape Town.

> [LeVaillant's] contemporaries were divided over the authenticity of some of his claims: while many readers revelled in the colourful adventures, others greeted these works with more scepticism, discovering in them elements of exaggeration and invention. Such concerns reflect dramatic changes in the accepted approach to writing in the sciences during and particularly after LeVaillant's lifetime. By the late 1780s, at the time when his first publication was in preparation, scholars were deeply divided over the most suitable language to employ in scientific works. Among LeVaillant's ornithological predecessors were those who strongly supported the use of figurative language in natural history descriptions and the involvement of the imagination in the attainment of scientific knowledge. The most prominent of these was Georges Louis Leclerc; Comte de Buffon, author of one of the eighteenth century's most famous natural history works. Others however insisted that the only appropriate style for scientific texts was factual and succinct. In their eyes, LeVaillant's intermingling of adventure, emotion and anecdote would have compromised the value of his work[...] LeVaillant's work must be judged against the backdrop of changing standards in field studies (Rookmaker, Mundy, Gunn, Spary 2004: 2–3).

Rookmaker reminds us of the importance of understanding the historic context from which the "texts" emerge, pointing out how the standards for collecting were in a state of flux. The style of writing he employed in his published journals was exuberant and captures the emotional impact that South Africa had on him. He was, perhaps in a more honest way, describing what he saw because he was not straining for scientific accuracy. This is probably why his work had such popular appeal – he brought the land he saw to life, he did not strive for the "gothic", dried-out style of writing. LeVaillant's gift for taxidermy, coupled with his entertaining style of writing, may be among the reasons for his enduring popularity. His journals of his travels in South Africa (1790 and 1795) were both translated into several languages, including English, and became the most widely read books of the time (Gunn & Codd 1981: 225).

I would like to make brief mention of another botanist and artist – Maria Sibylla Merian even though she never visited South Africa. Besides being exceptional as one of the only practicing female botanists of the time, she also shared LeVaillant's practice of retaining local names of plants. She collated as much information about plants from the indigenous people living in the areas where she collected. It is telling that part of the practice that Linnaeus insisted on from his students was to study local people's knowledge of the natural world and their manufacturing techniques (Koerner 1996: 152), yet he was adverse to preserving their names. He was looking for opportunities to exploit the benefits of plants[10] but also wanted the recognition of having "discovered" them, by practically signing his name on them.

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[10] Linnaeus really wanted to discover how to grow tea in Sweden to avoid the long, costly trips to China to procure it. "Linnaeus was also deeply involved with ways to make the Swedish economy more self-sufficient and less dependent on foreign trade, either by acclimatising valuable plants to grow in Sweden, or by finding native substitutes. Unfortunately, Linnaeus's attempts to grow cacao, coffee, tea, bananas, rice, and mulberries proved unsuccessful in Sweden's cold climate. His attempts to boost the economy (and to prevent the famines that still struck Sweden at the time) by finding native Swedish plants that could be used as tea, coffee, flour, and fodder were also not generally successful" (Waggoner 2000: www.ucmp.berkeley.edu/history/linnaeus.html). Linnaeus used the knowledge his students provided him with for his personal enrichment. He was not only a well-paid consultant to government on voyages, collection and colonial economies, but also sold some potentially lucrative ideas to entrepreneurs. Joseph Banks also played a role in the exploitation of indigenous plants for the economic benefit of

Jordaan maintains that LeVaillant's contribution to nomenclature was so small[11] that most botanists took no notice of him, and as a consequence "no attention was paid to what he has to say about the vernacular names, uses and nature of the indigenous and cultivated plants of South Africa" (1973: 77). Jordaan's remark supports the idea that botanists following Linnaeus excluded bio-ethnographic information from their investigations. LeVaillant's collection of botanical drawings is by no means small, it includes 47 depictions of plants. The paintings are sensitively rendered with careful consideration of the botanical information (see *Fig. 4b*). Jordaan puts forward the theory that the drawings were based on live specimens because the colours are so true to life (1973: 74). It is a bit of an anomaly as to why his contribution to botany is considered so insignificant. These drawings are in many ways superior and contain finer attention to botanical detail than the ones attributed to the artist and apothecrist Heinrich Claudius (1655 – c. 1697). Jordaan's detailed study of the botanical accuracy of the work concludes: "The unreliable indication of the localities contrasts with the faithful representation of morphological characteristics in the painting" (1973: 74). Yet Claudius's cruder sketches (see *Figs. 7, 9, 16* and *17*), some of which cannot be botanically identified, provided the basis for many new descriptions of plants notably by the botanists Johannes Burman, Jasper Commelin and James Petiver. If one understands LeVaillant's lack of "achievement" in the field of botany within the complex context of his reluctance to embrace Linnaeus's ideas; that he never considered himself a botanist; and the fact that he was French, this anomaly begins to make some sense. Claudius was an apothecary and therefore "qualified" to make these drawings endorsed as being accurate by the botanical community or they presumably would not have used them as references for the engravings for their esteemed botanical publications.

LeVaillant's commercial interests

LeVaillant enriched many collections including those of his patron, prominent ornithologist Jacob Temminck (1778–1858), whose collection later became the nucleus of today's Rijksmuseum collection. "While the collection was compiled for the purposes of scientific study, it was also a commercial resource... it is impossible in retrospect to determine which specimens were given away and which were sold. In frequenting the many collections, he [LeVaillant] was able to build up a solid network of contacts who could later have formed clientele for his trading activities" (Rookmaker 2004: 146). One cannot ignore how the commercial interests influenced the activities that collectors were engaged in. While one accepts that LeVaillant and other collectors like him who undertook these extremely dangerous and expensive voyages needed to fund them somehow. This however, does not deter one from considering how these commercial interests impacted on collectors and collecting practices. Scientific advancement was definitely not LeVaillant's only criteria for collecting, it was also fuelled by popular demand for exotic, unusual and outright outlandish specimens. The collections found and brought back to Europe were highly curated and were dictated in part by personal taste; the desire to entertain

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Great Britain. These "plant transfers" are said to have played a vital role in Great Britain's emergence as a world economic power (Musgrave, Gardener & Musgrave 1998: 31 & 34).

[11] None of LeVaillant's unpublished botanical paintings were used to describe any new species (Jordaan 1973: 78)

and amuse; and the need to excite botanical interest. LeVaillant said in his published journal *New travels into the interior parts of Africa in the years 1783, 84 & 85*, Volume 2 (1796):

> How many [plants] did I see, which, were they transplanted into the richest gardens of Europe, would constitute their chief ornament! And how often did I regret, that I was not a skilful botanist! Who knows, said I to myself, whether among this number art might not find some that would impart to our manufactures those beautiful and unfading dyes, which we have hitherto deemed the exclusive property of India? Who knows whether it might not discover new remedies for some of those diseases, which are deemed incurable, because our pharmacy supply no means for their relief? (1796: 143).

The above quotation reveals what Susan Pearce refers to in *On collecting: An investigation into collecting in the European tradition* (1995) as the "peculiarly intense relationship which Europeans have towards the production and accumulation of goods, including those goods which might reasonably be said to belong to other people" (1995: 39).

LeVaillant's need for fame coupled with his desire to possess and sell things that are were not his to own, expresses the entitlement many Europeans felt over the "uncivilized" countries, people, flora and fauna they visited. They simply took whatever they wanted without asking permission or paying anyone for the privilege. It never seems to have occurred to the botanical "explorers" that natural resources may have been of economic value to the indigenous South African people, and that they also had rights as to the control, use and movement of these specimens around the globe.

A non-scientific approach: A soldier's journal

The journal of Hendrik Jacob Wikar (1752–) is in my opinion remarkable for several reasons. Firstly his motivation for writing a journal differed significantly from those of contemporary writers. He was a soldier forced to run away from Cape Town in 1778 because of gambling debt. He was not commissioned to write a journal, but took it on as a way of ingratiating himself with the Dutch in the hope of them accepting him back into their society. His time in exile was spent living with the *Khoikhoi* at Goodhouse before he set out on a journey 400km eastwards along the Garieb River. The observations contained in his account were based on intimate connections and experiences gained from living with the people. He was adopted as a blood brother by Cabas, one of the members of the group he lived with. As a soldier he lacked the social and academic background of many other botanical "explorers". He was inspired to keep a journal, observing the social practices of the people he was living with. To my mind this is one of the most accurate descriptions of the time as it is unhindered by artifice. The historian E. E. Mossop wrote that the Dutch text has been for ethnologists as a source for "the customs, ceremonials and *rites of passage* of the '*Hottentots*' he adds: "There is food for reflection in the fact that what was written by this obscure clerk is of greater importance to posterity that all that has been preserved in the writings of the august and kind-hearted Governor, who pardoned him" (1935: 4–9). He wrote simply and accurately without any grandiose notions about what he was doing and ironically it was his lack of training that allowed him the freedom to see things

in a slightly less biased way. It differs significantly, for example, from the work of Sparrman, Gordon and Van der Stel, which seem self-conscious by comparison. Their accounts are written as outsiders looking in on a world that is far-removed and estranged from their own.

The principals of direct-sense observation that were endorsed by natural philosophical methodology, and as seen by the examples of Sparrman and LeVaillant, were not always adhered to, was perhaps more whole-heartedly and intuitively embraced by Wikar. His journal provides insights into the rituals, beliefs and way of life of the eighteenth–century *Khoikhoi* that goes far beyond many contemporary journals. He managed to capture some of the many medicinal and ritualistic uses of plants and has thereby preserved some of the knowledge handed down through an ancient oral tradition, in a manner that does not "other" the *Khoikhoi.*

Plant transfers and empire building: the impact of the Dutch East India Company

Hendrik Van Rheede tot Drakenstein was a colonial administrator for the Dutch East India Company who had a mandate to seize Malabar from the Portuguese. He considered the local medicines to be of vital importance to the Dutch occupation because the Dutch remedies were often ineffective against the diseases found in the area, or they did not travel well and spoiled by the time they reached their destination (Schiebinger 1998: 131). He arrived at the Cape in 1685, and during this time authorised Van der Stel to undertake an epic expedition to the Copper Mountains (1685–6). He instructed Van der Stel to "give a description of the country, mountains, rivers, roads and the people, as also of the timber and forests" (Van Rheede 1685 cited in Wilson, Van Hove-Exalto & Van Rijssen 2002: 10). His commercial interest in timber in this case is to be noted as it represents a different motivation for the collecting of information to that of a botanical "explorer". European nations were expanding their influence and this went hand-in-hand with huge influxes of foreign plants into Europe, Stafleu explains why this was significant for the spreading of Linnaeus's ideas:

> The rapidity with which Linnaean thought gained ground in England in the seventeen–sixties must be seen in the light of, on the one hand, the strong revival of floristic research, and on the other, the need for a practical system and nomenclature in a country with wide horticultural interests during a period of rapidly increasing plant introductions from many parts of an expanding empire (1970: 211).

Pratt says: "At most naturalists were seen as handmaidens to Europe's expansive commercial aspirations. Practically speaking, in exchange for free rides with trading companies and so forth, they produced commercially exploitable knowledge" (Pratt 1992: 43). These examples demonstrate the vital importance of considering the intentions that underpin the reason for collecting specific plants. Merian and Van Rheede's purpose was to collect for the sake of medical utility and the commercial exploitation on behalf of the Dutch East India Company; and not to classify for the sake of establishing a "universal system" (Schiebinger 1998: 134).

The move towards a clearly scientific mode of expression

As the field of botany grew and understanding expanded in the eighteenth century, the need to collate information and include detailed descriptions of the environments of plants was emphasised. This new era of "scientific explorer-artist-writers" were trying to capture what they saw with their own eyes in an unbiased way and "with a mind free from prejudice" (Paterson 1789: v). Many introductions to the journals of the eighteenth century contain monologues about the ability of the individual to achieve this unrealistic goal:

> The scientific explorer-artist-writers, in trying to break from the limits of solipsism, custom, and habits of representation, strained to be extra-referential. What emerges from their texts and illustrations is a sense of continuing and demanding alertness to the human desire to inflict oneself on the world. This vigilant resistance to the temptations of illusion and unguided imagination and this denial of self-imposition give these accounts their special flavour of authenticity (Stafford 1984: 2).

Burchell's writing style reflects how he was striving for scientific clarity and he self-consciously asserts his role as an empirical observer. This is demonstrated in the preface of his journal *Travels in the interior of Southern Africa* (1822):

> As they [referring to his travels] commenced with a mind free from prejudice, and in the purist spirit of independence, so they have been conducted, and so they are now concluded. It is not asserted that they are exempt from the natural chance of error to which all human observations are liable; but that their claim to be, even to the minutest particular, regarded as a faithful picture of occurrences and observations, stands on a basis never to be shaken; the confirmation of which is readily left to every honest and unprejudiced traveller who may hereafter traverse the same ground (1822: i).

Judging by this statement above, Burchell did not think that he was biased, a statement that by postmodern standards, seems naïve. William Paterson (1755–1818) was sent to the Cape to collect for the eccentric Countess Strathmore and arrived in the Cape in 1777 (Gunn & Codd 1981: 273). In the introduction to his published journal he states:

> In producing the present work, none of the common arts of compilation have been employed; but this circumstance it is presumed will not lessen its value in the eyes of rational persons: since what it loses in entertainment it gains in authenticity... The public may depend upon it, they are here presented with a series of facts, noted down on the spot, without additions, with no ornaments of rhetoric, with nothing to recommend them but the simple form of truth, and perhaps some degree of accuracy (1789: v–vi).

Paterson is no doubt alluding, in rather disdainful terms, to the flamboyant style of LeVaillant. He appeals to "rational persons" and is posturing himself as a scientist and prides himself on his accurate powers of observation. He reflects the common desire of the late eighteenth century to distinguish his work as reflecting "authentic" experience. He clearly wished to distinguish his work from that of writers of "fiction", here he is probably taking another jibe at LeVaillant. It is interesting that he makes the claim that the notes are unedited, reaffirming the authenticity of

the work. While Paterson's tone is not quite as vain as Burchell's, he none the less wishes to assert the superiority of his work because of its empirical content.

Some of the central ideas of natural philosophy had shifted significantly from the time that LeVaillant to the time when Burchell and Paterson visited South Africa and this is discernable in the analysis made of the different journals. This highlights the issues surrounding the role social intelligence plays in the formation of "scientific" thought and discursive practices.

The racist legacy of the botanical "explorers"

It is a direct result of seventeenth–and eighteenth–century thought and botanical practices that South Africans have inherited plant names that acknowledge the Europeans that "discovered" them. Many of the journals written by botanists and "explorers", such as Gordon, Burchell, Paterson and Sparrman, seem to self-consciously avoid embellishments of any kind, and perhaps reflect Linnaeus's call for unadorned rhetoric. Linnaeus is responsible for another curious aspect of plant naming: he promoted the use of botanists' names for plant names because he regarded their botanical efforts as great deeds, the engagement in which physical and mental hardships had to be endured. Linnaeus felt it was "a religious duty" to preserve the memory of these men to science (Schiebinger 1998: 136). While this tradition is less popular today, it still continues.[12] The names of botanists who first describe a new species are always attached to plant names.[13] The results, implications and effects on indigenous knowledge are only being considered now, 200 years later. This indicates how deeply embedded in our way of thinking the self-serving and congratulating European attitude is. The observations contained within their pages were considered scientific and therefore beyond reproach. Natural philosophers' opinions were respected and they provided "insight" to the behaviour of natural phenomena. This explains why scientists became government advisors on policies regarding the rights of certain people, like the *Khoikhoi* for example, who were regarded in the eighteenth century to be (scientifically) inferior people to Europeans.[14] Natural philosophers created an aura of absolute "truth" about their accounts and the impressions left by these publications were deep. We are arguably still struggling to rid ourselves of their entrenched racist agendas. What we know about the *Khoikhoi* has been handed down through written accounts and from a scant oral history. Historian Richard Elphick has conducted in-depth studies on the Cape *Khoikhoi* has this to say about his research: "The sources for this work are entirely written: virtually no oral traditions are available, the Cape *Khoikhoi* being now extinct" (Elphick 1985: xviii). We therefore base our understanding of the *Khoikhoi* on impressions as written by Europeans. It is a sad fact that the dominance placed on "texts" by

[12] The naming of a plant is left up to the sole discretion of the botanist who describes the plant. Wives, girlfriends and colleague's names are often incorporated. Correct botanical protocol dictates that the name of the botanist who first described the species follows the name of the plant.

[13] "A plant name, when written in full, is followed by the author's name or authors' names. The author is the person who first validly published that name. For example, *Leersia denudata* (Launert) was first published by Georg Oskar Edmund Launert, and *Eragrostis acraea* De Winter by Bernard de Winter" (Victor, Koekemoer, Fish, Smithies & Mossmer 2004: 66).

[14] The issue of naming of indigenous peoples is dealt with in Appendix A.

Europeans, has resulted in a one-sided account of the *Khoikhoi*. We will never truly know these people and neither will we know how they conceived of and interacted with "nature".

Conclusion

Accounts by travellers contributed to Europeans' understanding of colonised countries. The opinions contained in them were read by many people in Europe and influenced the way they perceived the "new world". Journal descriptions and illustrations formed part of the modern scientific practice of collection and display, which treated "nature" as a separate decontextualised entity. The fine line between giving accounts that were accurate and "scientific" to ones that were entertaining to read and would have wide audience appeal was often breeched. Even the journals that have been lauded as being scientifically valuable show evidence of "othering" of indigenous culture and "nature". While references to people betray an obvious negative Eurocentric bias, it is not always so easily recognisable when applied to plants. In my mind this makes it a far more subtle and therefore dangerous form of "othering". The innocent *Euphorbia* is transformed into a fantastical sea-like growth at the hand of LeVaillant, women's breasts drop off when bitten by a serpent according to Paterson, Gordon's "incorrectly named *dasje*" and Van Rheede tot Drakenstein's need to appropriate plants for the progress and success of the Dutch East India Company all betray their personally biased way of viewing and interacting with "nature". The introductions to journals were a battlefield for asserting the superiority of one text over another. Professional jealousy was apparent in the references made in these introductions and this is perhaps one of the most revealing aspects of these journals. They show the very human, fallible desire to be better than others. By the late eighteenth century natural philosophers had grown in social status and they often occupied government positions and were consulted in making policy decisions, especially with regard to the rights of certain minority groups of people. There was a growing sense of entitlement by Europeans who seemed to assume they could take what ever they wanted from South Africa. The number of specimens leaving the country and being successfully cultivated in European gardens increased exponentially towards the end of the eighteenth century. This was the beginning of the era of extreme exploitation of South Africa's natural resources effected to the detriment of indigenous culture and knowledge.

Chapter 3: Disciplining "nature": a discussion of the use of botanical art as an intended means of reflecting "truth"

In this section I question the notion that art can reflect the "truth" and examine the adequacy of botanical illustration to represent "nature" faithfully. I look at how the role of the artist was underplayed in the seventeenth and eighteenth centuries and conclude that this may have been a conscious decision. It served the purposes of the natural philosophers to make audiences forget that the hand and eye were involved in making the image. The acknowledgement of the human who made the image would imply bias and thus the inherent slant of an artistic interpretation affects the scientific integrity of the image.

I discuss the formulation of a code of rules for botanical nomenclature – particularly the use of Latin. The taxonomic systems were aimed at creating order out of the seeming chaos of nature and botany. These aims were underpinned by religious convictions as Slaughter explains:

> Essentialism and natural history find their proper expression in scientific classification whereas the proper representation or expression of mechanistic philosophy is mathematics. Both are images of order, as are the Great Chain of Being and the Newtonian clockwork universe. The one deals with quantities while the other operates on qualities, but both are attempts to create a well-formed representation of the system and order of nature. Taken together the two methods reveal the common goal of the seventeenth century *virtuosi*: the verification of order (1998: 7).

In the late eighteenth century botanical nomenclature became widely accepted and eventually formed part of the European languages and was accepted as the "truth" about plants. "Linnaeus's system alone launched a European knowledge-building enterprise of unprecedented scale and appeal" (Pratt 1992: 25). Once this psychological advantage was gained it allowed natural philosophers to impose their understanding on natural phenomena. Slaughter states:

> The next problem is what to do with all the bits and pieces once they have been acquired, and probably the most basic and obvious thing is to arrange or classify, to group particulars, reduce the sheer number of individual variations, to generalise. This is the taxonomic step taken by the natural historians. Classification is, however, only half-generalisation local or limited generalisation. What comes next is universal generalisation – predictive theories, universal laws, explanations that range over all things (Slaughter 1998: 8).

In my research I have compared copies of the field sketches made of South African plants and taken back to Europe. I make detailed comparisons between them to show how the artist is present in the interpretation of the image even though the authorship of the works remain largely unresolved. The anonymity of the artists is linked to social and cultural practices of the era.

The universal language movement in the "scientific revolution"

Many natural philosophers developed "universal" classificatory schemes and tried to popularise their ideas to have one scheme to preside over the rest. Linnaeus's *Systema naturae* (1735), along with other prominent natural philosophy publications such as Buffon's *Histoire naturelle* (1749) and Adamson's *Familles des plantes* (1763) all proposed a unified system for naming, ranking and classifying all living organisms. They developed nomenclatures – combinations of words that designated or nominated things – that were early attempts to universalise living organisms under a single system. "In 1729 Linnaeus's best friend (also an Uppsala student) has similarly written a local flora, "ordered", as he put it: "after the very simplest and clearest method", namely his own" (Koerner 1996: 150). Even though natural philosophers remained divided on how the system should be constructed, this totalising classificatory project was a common goal that distinguishes the period (Pratt 1992: 28). Taxonomy is another kind of language or representational system developed to accommodate a more traditional analysis of nature based on essential natures and kinds (Slaughter 1998: 12). It was a language designed to meet the needs of the botanists who created them, and based was on an understanding of taxonomy that was tied into their religious and sexist beliefs. Slaughter comments on the methodology behind differing approaches to universal languages:

> Method arises from the nature of the phenomena being investigated and it is ultimately method which differentiated the new mechanistic philosophy from natural history, differentiated chemists and physicists from naturalists and natural historians. By virtue of their methods the language projectors find themselves allied with natural historians, particularly biologists. What binds the projectors and naturalists together is their common basis in essentialism and their procedures of collection and taxonomy. To the extent that classification was an important activity in the seventeenth century – and it was – we may say that it is a continuation of a philosophical position of essentialism, being drawn still further to its logical conclusion. The language projectors were just one of many groups who participated in the drawing of that conclusion (Slaughter 1998: 6).

Linnaeus constructed a "universal language" that serviced his particular ideology. In other words it was specific to the particular needs he identified, and was not "universal" *per se*.

The analytical language of John Wilkins (1964) describes a curious system for classifying animals in a Chinese encyclopedia that Jorge Luis Borges stumbled upon:

> In *The analytical language of John Wilkins*, Jorge Luis Borges calls our attention to one of history's curiosities, a Chinese encyclopedia entitled the *Celestial emporium of benevolent knowledge*. 'On those remote pages', Borges reports, 'it is written that animals are divided into (a) those that belong to the Emperor, (b) embalmed ones, (c) those that are trained, (d) suckling pigs, (e) mermaids, (f) fabulous ones, (g) stray dogs, (h) those that are included in this classification, (i) those that tremble as if they were mad, (j) innumerable ones, (k) those drawn with a very fine camel's hair brush, (1) others, (m) those that have just broken a flower vase, (n) those that resemble flies from a distance' (Foucault 1970: xv).

The Chinese classification of animals above seems random and illogical if not completely ludicrous; yet it reflects a particular philosophy. Borges's curious Chinese classification prompted Foucault to question systems for categorising "nature".[15] I have applied these specifically to Europe. Foucault explains how being confronted with this system for categorising animals prompted him to realise the extent to which language becomes "naturalised" through words that seem innocent but are in fact manipulated to create the impression of representing the "truth" of a matter:

> That passage from Borges kept me laughing a long time, though not without a certain uneasiness that I found hard to shake off. Perhaps because there arose in its wake the suspicion that there is a worse kind of disorder than that of the incongruous, the linking together of things that are inappropriate; I mean the disorder in which fragments of a large number of possible orders glitter separately in the dimension, without law or geometry, of the heteroclite; and that word should be taken in its most literal, etymological sense: in such a state, things are 'laid', 'placed', 'arranged' in sites so very different from one another that it is impossible to find a place of residence for them, to define a common locus beneath them all. ... This is why utopias permit fables and discourse: they run with the very grain of language and are part of the fundamental dimension of the *fabula*; heterotopias (such as those to be found so often in Borges) desiccate speech, stop words in their tracks, contest the very possibility of grammar at its source; they dissolve our myths and sterilise the lyricism of our sentences (Foucault 1970: xvii).

In the eighteenth century there was a need for a system that was simple, yet also gave the required botanical information needed to identify a plant became necessary. Such a system would assist botanists to calibrate all the known information about a specific plant. A unified or "universal" system could potentially facilitate better co-operation between botanists working towards the common goal of improving their understanding of the natural world. In pre-Linnaean times natural philosophers tended to give species long, unwieldy, unfixed Latin names[16] that acted as descriptions of plants. These were often changed depending on who was describing the plant. Added to this was the plethora of local names given to plants. Koerner explains the awkwardness of this method:

> Early modern botanists, Linnaeus included, constructed diagnostic phrase names (a brief description which simultaneously functioned as a proper name)...These phrase names were up to half a page long. They also varied from author to author ...Diagnostic phrase names changed over time, even in a single author's *oeuvre* (Koerner 1996: 149).

As indicated by Koerner in the above quotation, plant names were not fixed and stable in pre-Linnaean times, but differed between authors, making the job of identifying which plant was being written about difficult. It created confusion amongst natural philosophers in their attempts

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[15] In his essay the *Order of things* (1970) Foucault explains how these systems reflect systems of thought:
So much so that the Chinese encyclopedia quoted by Borges, and the taxonomy it proposes, lead to a kind of thought without space, to words and categories that lack all life and place, but are rooted in a ceremonial space, overburdened with complex figures, with tangled paths, strange places, secret passages, and unexpected communications (Foucault 1970: 6).

[16] In pre Linnaean times the silver tree was named *Leucadendron Africana, abor tota argentea sericea foliis integnis At...(undecipherable) dicta Pluk.* Which reads in English: "African white-leaved, an entirely silvery silky tree with its hair- covered leaves, and called..." (Karsten 1951: 82).

to compare two different descriptions of the same species. The work on developing a unified system was not begun by Linnaeus. His work was pre-empted in the early seventeenth century by botanists such as the Swiss Bauhin brothers who produced *Pinax Theatri Botanici* (1623). The book attempted to clear up some of the confusion caused by all the different names for plants. This pre-Linnaean work listed the 6000 species known to the Bauhins, but also listed the names given to them by previous workers (Stace 1985: 25). This work discarded the botanical listings and introduced a system of binominal nomenclature (Wijnands 1996: 9). All the known phrase names and synonyms for plants in literature were put forward in this first work that attempted to untangle the confusion created by all the different names of plants. Linnaeus was working towards a similar goal and according to the botanist Clive Stace, "his main contribution was to bring order to the bewildering array of literature, systems of classification and plants which confronted the eighteenth–century botanists" (Stace 1985: 27). Bacon was trying to achieve the same goal in Britain, Shapin states:

> The poor state of existing natural philosophy was widely ascribed to inadequate quality control over its register of facts. If just any experience report were to be credited, then the house of natural philosophy would resemble the Bedlam or Babel that some modern suggested it was. Bacon proposed a set of techniques for establishing that facts about nature were adequately observed, testified to, and recorded. Nothing was to be admitted into the register of natural fact 'but on the faith of eyes' (that is, by eyewitness) 'or at least of careful and severe examination: away with antiquities, and citations or testimonies of authors; all superstitious stories and old wives' fables were to be set aside (1998: 87).

Adriaan van Royen (1704–1779) was the professor of botany and medicine in Leiden after the taxonomist Herman Boerhaave. "In his preface [*Methodus naturalis praeludium*] van Royen explains his system of nomenclature and makes it clear that Linnaeus, with his *Critica botanica*, has made it possible to end the confusion of generic names" (Stafleu 1971: 161). Slaughter describes in her thesis the intention behind the creation of a scheme for categorising "nature":

> The focal point in the language schemes is, clearly, order of some sort. The early universal languages attempt to bring order into the linguistic code; the more developed, philosophical languages tackle the order in and of nature. The tables or the taxonomies of the universal languages become the most crucial aspect of the universal language movement (1998: 3).

Slaughter also stresses the considerations of accurately representing notions placed on the universal language movement. Bacon argued "that many words existing in natural language were imprecise; they did not clearly represent the real and true phenomena of nature" (Slaughter 1998: 2). There were concerns that the language used ran the risk of perpetuating old errors. There are other consequences to consider such as the effects discourse has on modes of thinking about a particular subject. In *The order of things* (1970) Foucault says:

> There would appear to be, then, at the other extremity of the earth we inhabit, a culture entirely devoted to the ordering of space, but one that does not distribute the multiplicity of existing things into any of the categories that make it possible for us to name, speak, and think (1970: 6).

Slaughter postulates on how a universal language is constructed, and effectively becomes an abstracted means whereby humans impose their intellect on "nature":

> It is at this point, where the order of nature is distinguished from the order of language that the influence of science comes in. In order that nature be properly represented in a system of symbols it is necessary that we discover the simple elements on which all phenomena are based, or from which all phenomena are constructed, or by which all phenomena can be analysed. The analysis of nature into its simple elements or component parts was understood to be the prerequisite of a philosophical language. Constructing it required no less than providing a model or theory of nature. In short, it became a scientific activity (Slaughter 1998: 2–3).

The use of language for classifying systems introduces new words into speech. The classifying system then can be said to codify thinking about plants. The system becomes a "natural" part of the way we think and speak about plants. By asserting a code of rules on the chaos of "nature", natural philosophers at least gain the impression they are able to control "nature". Questions on the authority of the system eventually decline as the system become more widely accepted. While botanists continually review taxonomic systems, it still provides a framework for how plants are written and spoken about. Whether or not a taxonomic system is furthering the understanding of plants is questionable. Pratt sums up the over-arching ambition of the system:

> The eighteenth–century classificatory systems created the task of locating every species on the planet, extracting it from its particular, arbitrary surroundings (the chaos), and placing it in its appropriate spot in the system (the order – book, collection, or garden) with its new written, secular European name (Pratt 1992: 31).

Botanical Latin and Linnaeus's sexual system

> 'Those that wish to remain ignorant of the Latin language, have no business with the study of Botany'. So wrote John Berkenhout in 1789 (Stearn 1967: 6)

The "universal language" movement created order out of the chaos of nature by using a specifically designed linguistic code called botanical Latin. Stearn gives a succinct definition of what botanical Latin is: "Botanical Latin is best described as a modern Romance language of special technical application, derived from Renaissance Latin with much plundering of ancient Greek, which has evolved, mainly since 1700 and primarily through the work of Carl Linnaeus (1707–78), to serve as an international medium for the scientific naming of plants in all their vast numbers and manifold diversity" (Stearn 1966: 6–7). He asserts that science is unable to advance without forming a specialised vocabulary that is both economical and precise in "designating things and concepts" (Stearn 1966: 10). Latin has the advantage of not being attached to a particular modern culture and it contains words that allow for specialised, detailed yet concise descriptions. Latin, however, was only understood by an elite group of highly and expensively educated men. There were very few eighteenth–century women that would have the education to understand Latin, its choice therefore excludes the majority of people. In his

work *Botanical Latin* (1966) William Stearn has suggested that Latin was chosen for international communication between scholars "possibly because few women read Latin" (Stearn 1966: 7).

The sinister side of the system was its tendency to "other" non-European worlds. For example, Linnaeus included six categories of people in his system of classification of animals. The system includes the "wild man" and "monster" categories. Academic Mary Pratt has summarised theses categories and here I reproduce the two that are pertinent for this discussion:

> c. European. Fair, sanguine, brawny; hair yellow, brown, flowing; eyes blue; gentle, acute, inventive. Covered with close vestments. Governed by laws.
>
> e. African. Black, phlegmatic, relaxed. Hair black, frizzled; skin silky; nose flat, lips tumid; crafty, indolent, negligent. Anoints himself with grease. Governed by caprice.
>
> ...One could hardly ask for a more explicit attempt to "naturalise" the myth of European superiority (Pratt 1992: 32).

While the repression of the "other" is obvious in descriptions and depictions of people, it is less so in the exercise of imposing taxonomic order onto plants.

It is revealing what Linnaeus insisted be left *out* of his naming system. He disallowed any local names for plants to be maintained, considering them to be "barbarous" (Schiebinger 1998: 136). Academic feminist writer Londa Schiebinger raises and important point about the choice of Latin as the preferred language of botany: "Botanical Latin might have incorporated customary names from other cultures as plants from those cultures entered Europe. But this did not happen" (Schiebinger 1998: 135). The rules that Linnaeus laid down for the naming of plants is outlined by Schiebinger in her essay *Lost knowledge, bodies of ignorance, and the poverty of taxonomy as illustrated by the curious fate of "Flos Pavonis", an abortifacient* (1998):

> Linnaeus's extensive rules for botanical nomenclature banished many things: European languages except for Greek or Latin; religious names (he did allow names derived from European mythology); foreign names; names invoking the uses of plants; names ending in *-oides*; names compounded of two entire Latin words; and so forth. Linnaeus retained 'barbarous names' only when he could devise a Latin or Greek derivation, even one having nothing to do with the plant or its origin. *Datura* (a genus in the potato family) he allowed, for example, for its association with the Latin 'to give, because it is "given" to those whose sexual powers are weak or enfeebled' (1998: 136).

Because Linnaeus's rules banned local names for plants, all connections with the plant's place of origin were severed. This is one example of how an exclusive, European-centered discourse asserted its dominance. Hence, the way in which botanical nomenclature developed "othered" indigenous knowledge. Linnaeus's decision to remove any ties through language with indigenous cultures, in my opinion, renders the choice of Latin as the accepted language of botany a discourse that excludes all other languages. It is by implication, a language of exclusion rather than inclusion and a direct and clear example of "othering" the cultures from which plants were taken.

Significantly, plant descriptions accompanied by illustrations, still appear in Latin today. Instead of acknowledging the "origin" of the plant, many botanical names conserve the names of the botanists who "discovered" them. Many plants from diverse sources across the globe, through their name, pay tribute to the colonisers. Names like *Gordonia, Commelinaceae, Thunbergia, Witsenia, Massonia, Burchellia* glorify those men who implemented Linnaeus's system. The name *Lachenalia hirta*, for example, honours Werner de la Chenel (1736–1800) professor of botany in Basel. The name *hirta* means hairy and relates to the stiff hairs present on the margin of the leaf. The common Afrikaans name for the same plant is *Haarblaar viooltjie* and it is coincidence that both names refer to the morphology of the plant. There are other botanical names that have a different etymology, for example, the name *Moraea fugax* is filled with the "foreign semiotics" (Bunn 1994: 129) – it honours Linnaeus's wife Sara Elisabeth Moraea (Jackson 1990: 24), *fugax* which means transitory or fleeting refers to the plants' morphology. The common names are *Soetuintjie* and *Hottentotsuintjie* make reference to their use by the *Khoikhoi* as a source of food. The Latin name has erased the information that ties the plant to the *Khoikhoi* people. The absence of any colloquial names of plants or the places they came from are a reminder of the voices silenced, and knowledge lost by the process of Latinising of botanical naming systems.

The sexual system invented by Linnaeus was aimed at reducing the huge amount of variables presented by plants. Linnaeus's system grouped particulars and made generalised assumptions in order to contain the complexity of "nature". He admitted that it was an artificial system. "[T]he success of his system did not rest on the fact that it was 'natural', capturing God's order in nature – Linnaeus's desirable but still unattainable goal. Indeed, he readily acknowledged that his system was highly artificial. He focused on purely morphological features such as the number of sexual partners" (Schiebinger 1996: 115). Koerner states: "Today Linnaeus's binominal nomenclature is considered his only lasting contribution to science" (Koerner 1996: 149). Linnaean taxonomic schemes devised in the eighteenth century have been largely discredited today and all that remains of his ideas are the language projectors he devised.

An example of the subjective influence on Linnaeus's "science" was his obsession with equating plant reproduction with human gender traits. In her essay *Gender and natural history* (1996) Schiebinger says Linnaeus "imagined that plants have vaginas and penises and reproduce in marriage beds" (1996: 163). Linnaeus's "sexual system" was presented in *Systema naturae* (1735). It evaluated the role of reproduction as a "universal" function. "For Linnaeus reproduction contained the secret working-plan of the Creator" (Engel 1964 cited in Stafleu 1973: 118). His ideas about plant taxonomy are shown by these examples and attest to the social constructs surrounding human sexuality that underpinned Linnaeus's reasoning. In *Praeludia Sponsaliorum Plantarum* (1729), for example, he equated the sexual reproduction of plants to human social practices like marriage: "The flowers' leaves ... serve as bridal beds which the Creator has so gloriously arranged, adorned with such noble bed curtains, and perfumed with so many soft scents that the bridegroom with his bride might there celebrate their nuptials with so much the greater solemnity. When now the bed is so prepared, it is time for the bridegroom to embrace his beloved bride and offer her his gifts..." (Linnaeus 1729: n.p.).

Linnaeus related marriage to sexuality because of his Christian beliefs and he extended this metaphor into the structure of his "sexual system" for categorising plants. He speaks of marriages between plants, of them having husbands and wives "in separate beds" or in "one bed".[17] There was a moral outcry to his system that was lead by the botanists Smellie and Siegesbeck, who ranted that God would never introduce such "loathsome harlotry" into the plant kingdom (Siegesbeck cited in Schiebinger 1996: 115). Linnaeus's sexual system highlighted the issue of sexual difference – a preoccupation of the era. Schiebinger states: "That Linnaeus supposedly found European sexual hierarchies reconfirmed within the plant kingdom indicated to thinkers of the time the "naturalness" of women's continued subordination to their fathers and husbands" (Schiebinger 1996: 115).

Goethe was opposed to the schematisation of "nature", and felt that "nature" could not be represented by a system of symbols and that these lead to confusion rather than enlightenment:

> Goethe's own view was that mathematical formulae and symbols were no substitute for the phenomena of nature, and that by schematising the world of nature in this way one is obscuring rather than illuminating it. In other words, he preferred to adhere to an organic interpretation rather than subscribe to the rationalist tendency to translate everything into quantitative terms (Forbes 1989: 9).

Botany was practiced by men who imposed their religious and social bias on their understanding of "nature", the resulting discourse "others" indigenous knowledge and women. These marginalised groups were excluded from the process of "making" knowledge and the "grand narrative" of botany represents a one-sided view. Scientists need to become more aware of how cultural influences shape science. Acts of exclusion influence not only what we study but also how it is understood. "Only recently have we begun to appreciate that who does science also affects the kind of science that gets done" (Schiebinger 1996: 176).

Facsimiles of "nature"

Botanical sketches were part of the practice that reflects Linnaeus's aim to discipline and schematise "nature", and as such also bears the evidence of its failure to eliminate human interpretation from the making of the images. Botanical art played a role in validating scientific discursive practices and field sketches often provided the only, albeit removed link, to "nature" that the natural philosophers considered essential to their studies.

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[17] "However, Linnaeus's plant taxonomy was based solely on the number and arrangement of the reproductive organs; a plant's class was determined by its stamens (male organs), and its order by its pistils (female organs). This resulted in many groupings that seemed unnatural. 'Plants' without obvious sex organs were classified in the Class *Cryptogamia*, or 'plants with a hidden marriage', which lumped together the algae, lichens, fungi, mosses and other bryophytes, and ferns. Linnaeus freely admitted that this produced an 'artificial classification', not a natural one, which would take into account all the similarities and differences between organisms" (Waggoner 2000: www.ucmp.berkley.edu/history/linnaeus.html).

> The tradition of the Renaissance scholarship known as humanism figured importantly in the complex relations between the values placed on individual experience and the authority of ancient texts (Shapin 1998: 75).

Field sketches done on the spot from "nature" were deemed very important records by the eighteenth–century natural philosophers because they provided direct experiences of "nature" and did not rely on the observations of the writers of "ancient texts" as discussed in Chapter 2. These illustrations formed an integral part of the language of botany. Herbarium sheets and field sketches were removed from their origin and taken to Europe for study. There was a general tendency in the natural sciences to attempt to rule out human error from scientific investigations wherever possible. Forbes explains the fundamental criticism of Goethe's insistence on direct-sense experience:

> More fundamentally, however, the acceptance of Goethe's "axioms of explanation" implies that the truth about Nature is to be derived from sense-experience, a presupposition that was later to be destroyed... In other words, reasoning inductively from effect to cause is no guarantee that the conclusions obtained are valid (Forbes 1989: 13).

To begin a botanical investigation, a plant would be removed from its immediate environment so that it could be monitored under controlled conditions. The plant would be methodically arranged, numbered, named and catalogued. The specimen that was eventually used for study was hence a codified, abstract representation of a plant: it reflected the needs and ideals of the botanist, and objectified "nature".

A field sketch of a plant represents the first point of separation from empirical reality, the first level of abstraction. It is interpreted by the artist on the spot and is represented in a way that reflects the observer's interest in the plant and is dependent on the skill of the artist to accurately perceive and render "nature". It becomes a form of visual writing frozen in a particular point in time, and represents a tiny slice of the entire life cycle of a plant. The *drawing* becomes the object of "scientific" scrutiny, not "nature" itself. The image forms a part of the language used to express botanical ideas. The image represents an abstraction and objectification of the living, changing plant. Much of the plant's particularity is lost in translation.

While scientific endeavour generally remains the central focus of botanical art, one should not lose sight of the fact that the field sketches[18] were highly prized commodities – they were copied, providing the "original" reference material for many of the most esteemed botanical publications by aspiring botanists.[19] Field sketches were commissioned and collected by botanists and were used as references for copper and wood engravings and etchings which were the reproductive media of the time. This process of copying and mechanically reprinting an image represents a further removal from the original living plant. Botanical historian Phyllis Edwards

[18] One of the ways in which a plant could be recorded in colour, was by sending an artist to do a colour drawing of it. These colour sketches were generally done in the field and provided the reference from which paintings could be made.

[19] See appendix C for a complete breakdown of the copies of florilegia of South African plants.

Fig. 7. Heinrich Claudius (possibly), *Lachenalia hirta* (Thumb.) (c. 1685). Watercolour on paper, 330 x 210 mm. Collection: *Claudius album*, Plate B24. Acc. 7671. National Library of South Africa, Cape Town.

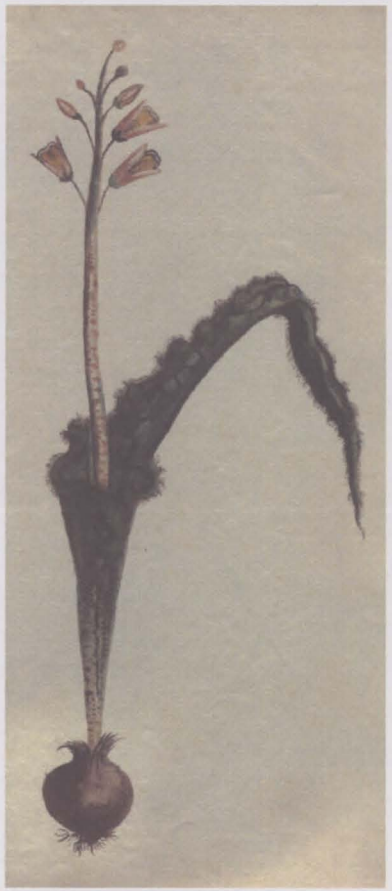

Fig. 8. Artist unknown, *Lachenalia hirta* (Thumb.) (1692). Watercolour on paper, 312 x 198mm. Collection: South African Museum, Cape Town. (Wilson, Van Hove-Exalto & Van Rijssen 2002: 72; Folio 48).

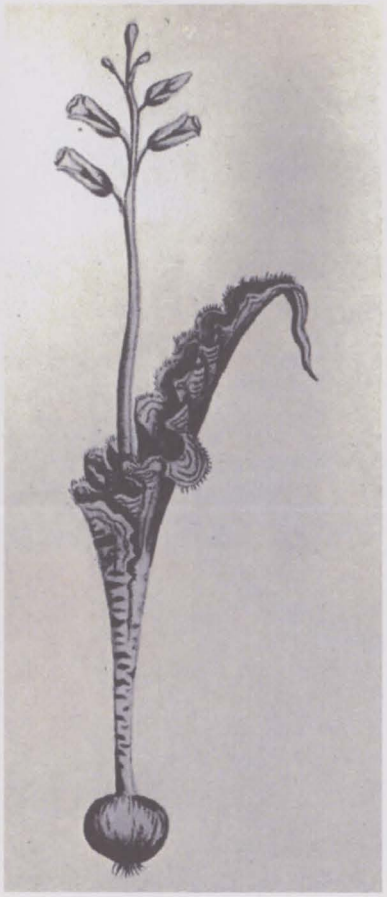

Fig. 9. Heinrich Claudius (possibly), *Lachenalia hirta* (Thumb.) (c. 1685). Watercolour on paper, 330 x 210 mm. Collection: *Fagel Ms. 984* Trinity College, Dublin. (Waterhouse 1931: Plate 795).

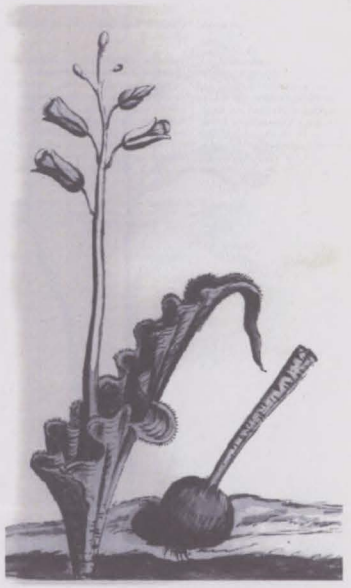

Fig. 10. Jan Moninckxx or Stephanus Cousyns, (possibly), *Hijacinthus Aethijopicus, monophijllos undulato, villoso, flore luteo* (1687–92). Ink drawing on paper. Collection: *Ms. germ. Qu. 238*. Staatsbibliotheek Preussischer Kulturbesitz, Berlin. (Wilson, Van Hove-Exalto & Van Rijssen 1996: 27).

Fig. 11. Engraver unknown, (detail) *Tab. LXXXVII.* (1767). (Petiver 1767: *Tab. LXXXVII.*). Collection: Banksian Collection, Botany Library, Natural History Museum, London.

From Petiver's publication *Jacobi Petiveri Opera, historiam naturalem spectantia: containing several thousand figures of birds, beasts, fish, reptiles, insects, shells, corals, and fossils: also of trees, shrubs, herbs, fruits, fungus's, mosses, sea-weeds, &c. from all parts, adapted to Ray's 'History of plants', on above three hundred copperplates, with English and Latin names ...*" (1767).

outlines some of the scientific uses of sketches and explains why they were so necessary. She also relates how mistakes occurred in the transcription of sketches to engravings:

> A 'typified' botanical name is a name linked to one definite element within the plant kingdom or a representation of such an element. Nomenclatural typus is that constituent element of a taxon to which the name is permanently attached, whether as a correct name or as a synonym. Linnaeus often based new species on published descriptions and figures, sometimes figures alone... Difficulties of making and preserving herbarium specimens, particularly in the tropics, and the superiority for general use of a drawing made from a living part to a dead fragment led many pre-Linnaean authors to rely primary on illustrations as records (Edwards 1978: 335).

Botanist John Rourke says that: "copying did not seem to have the same connotation of plagiarism in the 1700s as it does today" (2001: 32). There was no other technology that allowed for copies of these sketches to be made, besides doing them by hand. Often inferior artists were used, and sometimes they inadvertently changed important elements of the plant, rendering them less accurate than the originals. There are certain assumptions that a reader of an image makes. The image is an artificial construct that signifies a particular meaning in our culture. The image of the plant for a botanist may signify, for example, *Lachenalia hirta,* but for anyone else will signify "flower" or "plant". The botanist has a different way of interpreting the image because of his/her academic background, and others who have no interest in botany see the image in a less specific way. There are certain assumptions that are made about a botanical illustration even before a closer look at the image is made. Because botanical images belong to the world of "science" the reader will generally assume that it is an accurate representation of the plant, bringing into play social conditioning that tells us to trust the empirical nature of the "sciences".

The four copies (*Figs 7– 11*) of *Lachenalia hirta* are hand-reproduced impressions of one another. It is not possible to say which image was produced first, and all but one are copies that exist in a web of inter-textuality. It can be argued that none of the images provide a "true" reflection of the "real" plant, but they all bear traces of one another. However, where they differ is in finesse, style and sensitivity of rendering – all characteristics which vary according to which artist created them. Yet the artists who made these images remain anonymous. Though a process of European-centred knowledge production the image is transformed into a substitute for reality – they become convincing codes for scientific discursive practices.

Through intelligent guesswork the sketches contained in Van der Stel's journal have been attributed with some certainty to Heinrich Claudius who accompanied him on his trip to the Copper Mountains in Namaqualand. The reason surrounding the confusion of authorship of the Claudius florilegia is the existence of a number of copies of drawings (see Appendix C) and the fact that Van der Stel never mentions Claudius by name in his journal; he refers only to "my artist" in the text thereby demeaning the status of Claudius. Van der Stel views Claudius as a nameless object that belonged to him. The hand that created the work is underplayed it is as if the link to a person needed to be erased, with the drawing surviving through the ages as testimony to the scientific endeavour of the expedition into Namaqualand.

Anonymity and the construction of power

Many of the botanical artists of the era remain unacknowledged and their identities are shrouded in mystery. Artists did not sign their work and the men who commissioned them often did not regard their names worth preserving. The early plant collectors at the Cape were aided by the knowledge of their local guides, and would often not venture into the interior without a guide who had intimate knowledge of the terrain they wished to cover. To quote from Masson's account of his journeys that appeared in the *Philosophical transactions of the Royal Society* (1776):

> But both he and our servants refused to advance further; telling us, we were now on the borders of a powerful nation of '*Hottentots*', called '*Caffres*'; who they said, would kill us, were it only to get the iron belonging to our wagons. In consequence of these remonstrances, and the bad state of our carriage were in, being ready to drop to pieces, and many of our oxen sick, we, with much reluctance, consented to return the way we came (1776: 297).

The above quotation not only tells us about the important role played by the guides, but it also reveals Masson's attitude to the indigenous people. He clearly reveals his lack of understanding of the different groups of indigenous people, calling the people who lived beyond Mossel Bay "a powerful nation of '*Hottentots*', called '*Caffres*'". Although he uses the excuse of the poor state of his carriage, I would say that the more weighty issue of concern for him was the problem of not having a guide to take them through what had been painted by his guides as hostile territory. There are other instances in Gordon and Van der Stel's journals of the same decision being made by "explorers" when no guides were obtained or willing to go further than a stated place. Yet these guides, while they were sometimes named in passing, remain largely unacknowledged. Art historian David Bunn comments on the necessity of creating awareness of the nature of colonial activity:

> Colonial space, remember, is a site of regular ontological shock. It is filled with competing indigenous meaning, a foreign semiotics that does not accommodate class and gender distinctions in the same way, which must consequently be rewritten so that it appears willing to admit colonial appropriations (1994: 129).

Burchell spent four years traveling to so-called "unexplored" parts of South Africa aided by what he referred to as "*Hottentots*". He relied on their intimate knowledge of the landscape and its plants and is said to have named some of the plants he found after their indigenous names and uses. The same can be said of Gordon, and although he does name his guides (two "Boland *Hottentot*" servants Iteki and Koerikei) they are not credited for their important role in his expeditions (Cullinan 1992: 98). In a journal entry dated 19th November 1785 he mentions "my *Hottentot Hoedies*" and Coerkei who led the oxen. He also mentions Cabas, a young boy who he sort of adopted, and a Mozambiquan slave Castor (Cullinan 1992: 143). It is unusual that Gordon mentions the Khoikhoi in his team by name, this is contrast to Masson who states: "On the 10th of December 1772, I set out from the Cape Town, towards the evening, attended by a Dutchman, and a '*Hottentot*' who drove my wagon..." (Masson 1776: 269). No local people

who helped him are named in his account, whereas the prominent botanist Carl Peter Thunberg who accompanied him on one of his journeys is mentioned.

It is extremely difficult to determine with any certainty the identities of the botanical artists that often accompanied journeys into the interior to make visual documentation of their trips. According to the hierarchical order invented by the company, artists enjoyed no status at all, many artists were in the employ of the Dutch East India Company and were regarded as mere servants. This is further complicated by the fact that the men who commissioned them actually signed drawings made by unnamed artists. I have found examples from Masson and Gordon that attest to this fact – the work is inscribed with their own names. This common practice demonstrates the sense of ownership these high-ranking officials felt over work they commissioned. By signing work made by people other than themselves, Gordon and Masson were exercising their social power and asserting their dominance over the unnamed authors of the work. Gordon and Masson (I use these two as examples, there were others) were given powers by the Dutch East India Company and the British government and they embraced discourses that subjugated people of lower social ranking to them. In his essay *Beauty in truth* (2001) Rourke comments on the practice of not acknowledging artists:

> Other more or less contemporaneous travellers like the French zoologist François leVaillant (1753–1824) and Sir Joseph Banks's (1743–1820) botanical emissary Francis Masson (1741–1805) also possessed equivalent copies of paintings in the Gordon collection. They too were executed no doubt by some lowly anonymous painter. Social status was clearly a prerequisite for an artist's recognition in the strict hierarchical order that prevailed throughout this period of Dutch administration. Herein, perhaps, lies the answer to this curious riddle of the unnamed artists – this was an age in which social rank still outweighed creative talent (Rourke 2001: 32).

The anonymity of the guides and botanical artists demonstrates the colonial political will to name, own and control. The social code dictated by the Dutch East India Company doomed the artists in its employ to obscurity. Author Patrick Cullinan cites Forbes in *Robert Jacob Gordon 1743–1795* (1992) and establishes the very low pecking order an artist in the employ of the Dutch East India Company could expect: "We know, too, that in 1776 he [Schumacher] accompanied Hendrik Swellengrebel, the son of the governor, on a journey to the Eastern Cape, on which occasion, according to Professor Forbes, he was merely listed as *een tekenaar* (an artist), ranked between two wagon-drivers and above the cook" (1998: 32). It is only through clever guesswork that the possible authors of the florilegia of South African plants can be named. This is an extract from Gordon's journal where he refers to his artist (never by name):

> I thought that my artist, who against every warning always remained in the wagon, was lost. Reaching the wagon however we at first heard nothing, then after a while, a wretched moaning. When we had pulled him out it seemed that he had broken everything but after examining him and giving him some wine, found that he had only bumped the side of his cheek and had a light bruise on one hand (Cullinan 1992: 32).

In the above quotation from his journal, Gordon's attitude towards the artist Johannes Schumacher[20] is clear. Firstly he refers to him disparagingly as "my artist", his irritation is unmasked in the words "wretched moaning" which is further driven home by his implication that Schumacher was a complainer because the wounds he suffered were light. Gordon hardly ever displays such emotion towards anyone in his journals, as Cullinan says: "Poor Schoemaker! Every time Gordon deigns to mention him, it is with exasperation, an emotion he seldom registers with any of his other travelling companions" (1998: 57). Many of the works attributed to Gordon were more likely to have been executed by Schumacher. Yet Gordon's name has gone down in history as an artistic talent (in addition to all the other attributes he was supposed to have had) but one has to search diligently for Schumacher's name as Cullinan states:

> Why these impressive works – whether made by Gordon or Schoemaker – are seldom referred to in the journal deserves some consideration. It may be because they were regarded as routine records, where accuracy in conveying the look of a place was more important than artistic merit. Sometimes the need to get the 'look' of a place was taken beyond mere accuracy. Many of the drawings in the Gordon Atlas are composite – that is to say, the most impressive features of a landscape were included even if their topographical relationship to one another had to be distorted to do so. If making drawings was a routine for most travellers, as it was, then it is understandable that they are seldom referred to in the narrative (1992: 68).

Cullinan makes an important distinction in the above quotation. He speaks about artistic merit in relation to faithful documentation. In an era that was striving for scientific episteme, the thought of an artist having to interpret the material was not appropriate, and this may have contributed to the obscurity of these artists. The visual documents that these unknown artists produced were so valuable in their day, yet the authors have disappeared through the carelessness of the age of "Enlightenment". Artist Marion Arnold asserts the opinion that botanical art still remains obscure due to the negative stigma associated with it and this may stem from this era (2001: 148).

Analysis of the copies of drawings found

There are several sets of original watercolour drawings of Cape plants of the late sixteenth and early seventeenth centuries that were used as the basis of published engravings of the period. Today there are copies of these drawings in MuseumAfricA and the Brenthurst Library, Johannesburg; South African Public Library, Library of Parliament and South African Museum, Cape Town, Mary Gunn Library (South African National Biodiversity Institute), Pretoria and in the Botany Department of the Natural History Museum, London, the Bodleian Library, Oxford, the *Rijksprentenkabinet*, Rijks Museum, Amsterdam and in Trinity College Library, Dublin. The drawings are generally unsigned and it and it is very difficult to determine the authorship of these drawings. I have been fortunate enough to see quite a few of the originals. Many of these drawings are copies of one another. I have drawn comparisons between copies that are historically supported. (Refer to Appendix C for a description of the manuscripts used for this study and a history of their ownership that supports the comparisons about to be made).

[20] So little is known about this artist that I could not even find his date of birth and death.

Fig. 12a. Artist unknown, *Amyrillis* (1691). Watercolour on paper in bound volume. Collection: Petiver, *Banksian MSS No. 88*, G. N. 85.4. Botany Library, Natural History Museum, London.

This example of a field sketch is taken to be the original paintings used by Petiver in his *Gazophylacium Naturae and Artis* (Edwards: 1968: 243).

Fig. 12b. Artist unknown, *Amyrillis* (1775). Watercolour on paper in bound volume. Collection: *A collection of drawings by Francis Masson,* Natural History Museum, London.

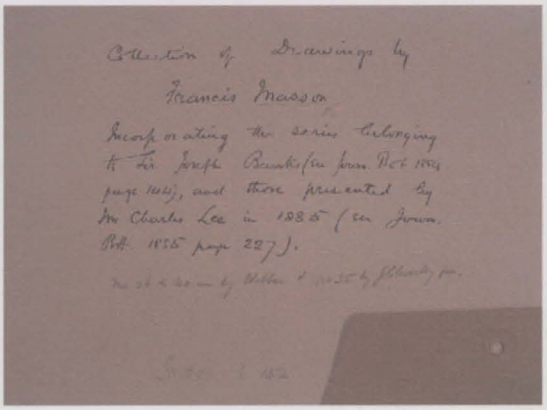

Fig. 12c. A hand written note on end pages of *A collection of drawings by Francis Masson* saying: "*Collection of drawings by Francis Masson incorporating the series belonging to Sir Joseph Banks (see Journ. Bot 1854 page 144), and those presented by Mr. Charles Lee in 1885 (see Journ. Bot 1885 page 227)". In pencil below: "Nos 26 & 40 are by Webber and No. 35 by J. Cleverley jnr.*". Collection: *A collection of drawings by Francis Masson* Botany Library, Natural History Museum, London.

In essence an illustration is an abstract, schematic representation, with considered composition, emphasising the diagnostic features of a plant. An illustration is highly subjective, and leaves much up to the individual interpretation of the artist. Therefore the field sketches that were seen as a means of representing "truth" in "nature" were codified representations:

> 'Truth' is to be understood as a system of ordered procedures for the production, regulation, distribution, circulation and operation of statements... 'truth' is linked in a circular way with systems of power which produce and sustain it, and to effects of power which it induces and which extend it (Rainbow 1984: 74).

In plant identification even slight changes to leaf shape, stamen shape size and numbers and colour can render the plant unidentifiable. So essentially, if the plant was incorrectly copied from life showing six stamens, these mistakes were re-copied and finally engraved into the iconotypes that were used as the authoritative botanical reference for the species. An artist's scrutiny is formed by their training, beginning from elementary principals (line, tone, composition etc.), and informed by their personal tastes and habits and is embedded in prejudiced attitudes surrounding notions of what society regards as "good art" or "bad art".

Fig. 12a & b are two typical examples taken from volumes of plant sketches owned by Petiver and Masson. Copies of volumes of drawings were made specifically for sale to prominent botanists and collectors who used them for the reference for engravings that appeared in publications. The examples show the difference in "quality" between sketches depicting how the images success is dependent on the ability of the individual artist. The analysis that follows is based on images that are clearly copies of one another. It is difficult to determine which version could be the "original" upon which the copies are based. In literature it is generally assumed that the copy is usually executed in an "inferior" style to the original drawing.

Fig. 13 depicts a page from Burman's *Rariorum Africanarum plantrum decades* (1738–39). The engraved sheet shows how distortions to the artwork appeared to make it possible to fit three images onto one page. The center *Pelargonium* has been horizontally scaled, and the other two have elongated stems, to allow the three images to fit onto the page. The page is aesthetically pleasing, highlighting the considerations taken by the engraver of the plate. The page is composed to achieve both visual harmony and botanical clarity. The text associated with the images forms an integral and important part of the picture. When a botanist wishes to confirm the species in a botanical image they will not refer to a living plant, instead they look for confirmation in literature. This confirms the dominance European culture places on texts, which is generally considered to be the superior reference.

When comparing *Figs. 13–19b* of an unidentifiable *Pelargonium,* the similarities between the drawings show that they are copies of each another. However, there are quite a few significant differences between the sketches; notably the treatment of the margins of the leaves differs (particularly of the engraved version); and the shape and colour of the flowers varies. Significantly, the number of the stamens differ (*Fig. 13–16* have six stamens and *Fig 17–19* have

Fig. 7. Heinrich Claudius (possibly), *Lachenalia hirta* (Thumb.) (c. 1685). Watercolour on paper, 330 x 210 mm. Collection: *Claudius album*, Plate B24. Acc. 7671. National Library of South Africa, Cape Town.

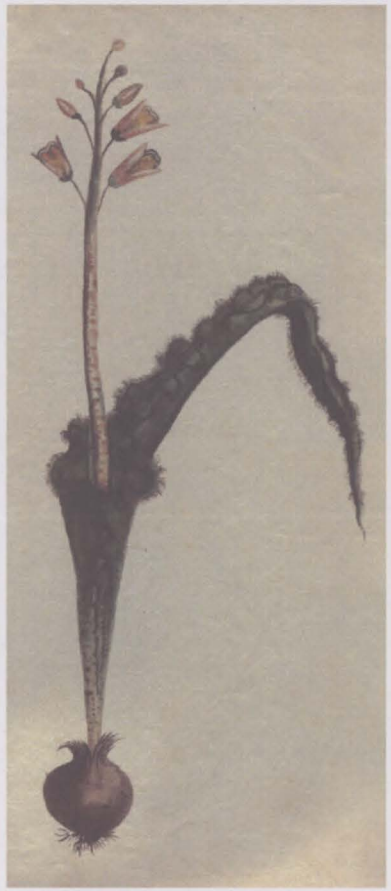

Fig. 8. Artist unknown, *Lachenalia hirta* (Thumb.) (1692). Watercolour on paper, 312 x 198mm. Collection: South African Museum, Cape Town. (Wilson, Van Hove-Exalto & Van Rijssen 2002: 72; Folio 48).

Fig. 9. Heinrich Claudius (possibly), *Lachenalia hirta* (Thumb.) (c. 1685). Watercolour on paper, 330 x 210 mm. Collection: *Fagel Ms. 984* Trinity College, Dublin. (Waterhouse 1931: Plate 795).

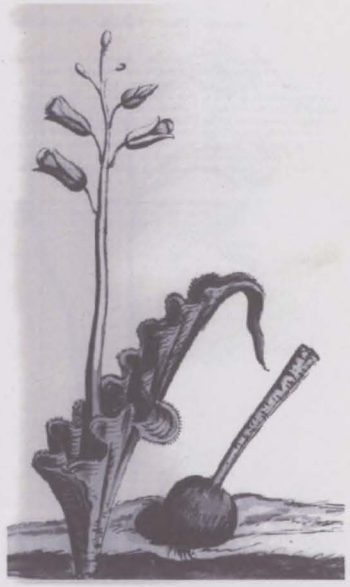

Fig. 10. Jan Moninckxx or Stephanus Cousyns, (possibly), *Hijacinthus Aethijopicus, monophijllos undulato, villoso, flore luteo* (1687–92). Ink drawing on paper. Collection: *Ms. germ. Qu. 238*. Staatsbibliotheek Preussischer Kulturbesitz, Berlin. (Wilson, Van Hove-Exalto & Van Rijssen 1996: 27).

Fig. 11. Engraver unknown, (detail) *Tab. LXXXVII.* (1767). (Petiver 1767: *Tab. LXXXVII.*). Collection: Banksian Collection, Botany Library, Natural History Museum, London.

From Petiver's publication *Jacobi Petiveri Opera, historiam naturalem spectantia: containing several thousand figures of birds, beasts, fish, reptiles, insects, shells, corals, and fossils: also of trees, shrubs, herbs, fruits, fungus's, mosses, sea-weeds, &c. from all parts, adapted to Ray's 'History of plants', on above three hundred copperplates, with English and Latin names ...*" (1767).

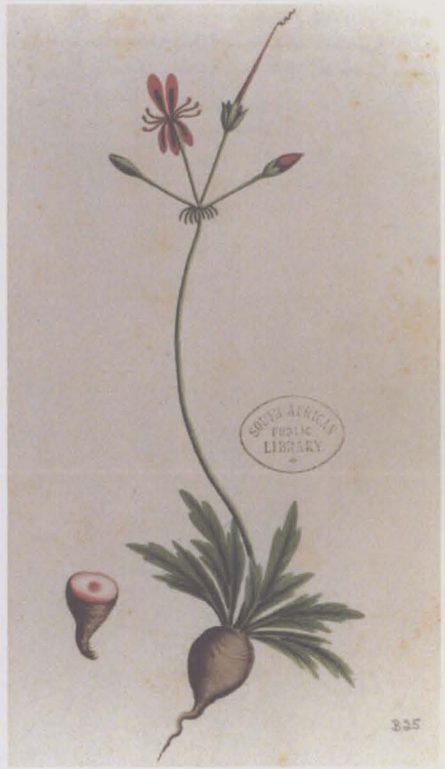

Fig. 13. Artist unknown, *Fig. 1 Pelargonium rapaceum, bofolium floribus maculatis* and *Fig. 2 Pelargonium rapaceum, foliis ternis, trilobatis & tridentatis, flore sanguinco* (1738–39). Printed engraving. (Burman 1738–39: 91; Tab. 35). Typically more than one specimen appeared on a page, complex aesthetic decisions needed to be made by the engraver to achieve both visual harmony and scientific accuracy, without destroying the empiricsm of the images.

Fig. 14. Artist unknown, *Pelargonium incrassatum (Andrews) sim Geraniaceae* (c. 1692). Watercolour on paper, 312 x 198mm. Collection: South African Museum, Cape Town. (Wilson Van Hove-Exalto & Van Rijssen 2002: 104; Folio 64).

Fig. 15. Artist unknown, *Pelargonium trifolium* (1601–26). Watercolour on paper, 410 x 260 mm. Inscription on page reads: "*Geranium* [crossed out] *Pelargonium* [in pencil above] *trifidum, 1601–26*" and right: "*Tab. 35, Fig. 2*" Collection: *Collection of watercolour drawings from the Cape, possibly by Voet, Burmann, Claudius, Oldenland,* No. 60. Botany Library, Natural History Museum, London.

Fig. 16. Heinrich Claudius (possibly), *Pelargonium* (c. 1685). Watercolour on paper. Collection: *Claudius album,* Plate B25. Acc. 7672: National Library of South Africa, Cape Town.

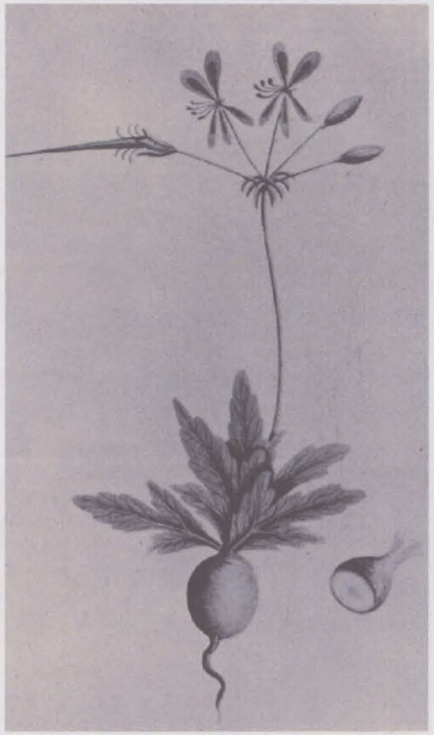

Fig. 17. Artist unknown (possibly Claudius), *Pelargonium trifidium Willd.* (c. 1685). Watercolour on paper. Collection: *Fagel Manuscript 984*, Trinity College, Dublin. (Waterhouse 1931: Plate 869).

Fig. 18. Jan Moninckxx or Stephanus Cousyns (possibly) (1687–92). Ink drawing on paper. Collection: *Ms. germ. Qu. 238*. Staatsbibliotheek Preussischer Kulturbesitz, Berlin. (Wilson, Van Hove-Exalto & Van Rijssen 1996: 53)

Fig. 19a. Artist unknown, *Pelargonium* (c. 1691). Watercolour on paper, 200 x 170mm. Collection: *Drawings Petiver, Banksian MSS No. 88*, G.N. (*Gazophylacii naturae*) 84. 11. Collection: *Banks Collection*, Botany Library, Natural History Museum, London.

Fig. 19b. Engraver unknown, *Pelargonium* (c. 1691). Engraving. (Petiver 1767: *Fig. 11. Cat. 457*). The caption in the publication reads: "*11. Cape Crane bill with a red Flower and Turnep-root. Cat. 457*".

Fig. 19c. Artist unknown, *Geranium Capense radice rapacea, flore sanguino. Pet G. N. 84.11 Cat. class. Top. No. 457.* (c. 1691). Watercolour on paper. Collection: *Sloane manuscript 5286 Nr. 36/ HK–66*, British Library, London. This comes from the collection owned by the Bishop of Compton (Edwards 1968: 244).

Fig. 20. Signed Webber, *Stapelia gordoni Mas.* (c. 1775). Watercolour and pencil on paper, 380 x 270 mm. Collection: *A collection of drawings by Francis Masson*, Botany Library, Natural History Museum, London.

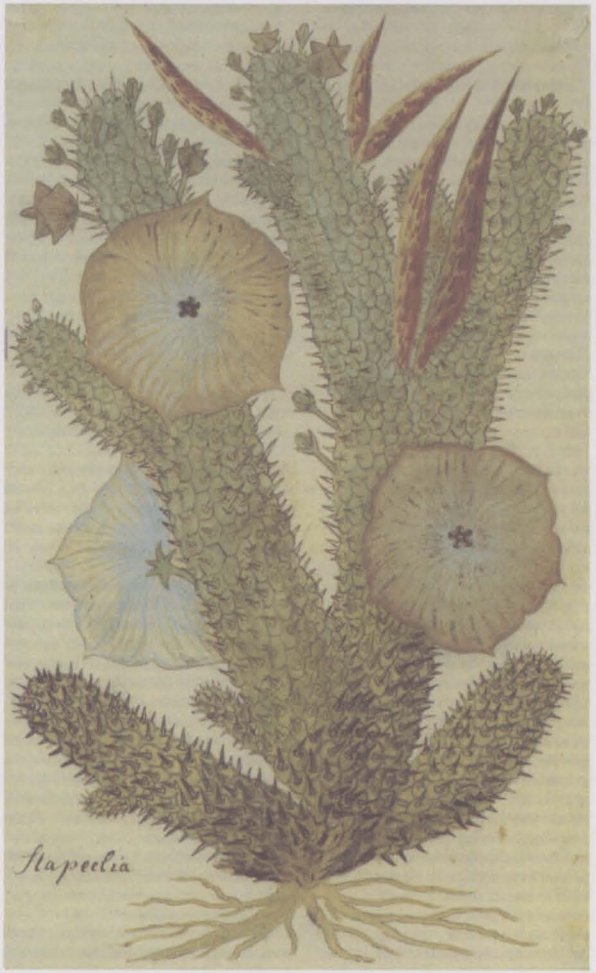

Fig. 21. Johannes Schoemaker (possibly), *Stapelia* (c. 1775). Watercolour on paper. Collection: *Gordon Atlas RM 91. Rijksprentenkabinet*, Rijks Museum, Amsterdam. (Cullinan 1992: 174; 78).

Fig. 22. Engraver: Makenzie, *Stapelia gordoni* (1796–97). Hand-coloured engraving on paper. (Masson 1796–97: 40).

four). The parts of flowers are particularly important for plant identification and the possible careless addition of two extra stamens renders the plant botanically unidentifiable.

The drawings were often very generalised. When *Codex Witsenii* was recompiled and annotated in 2002 the authors approached botanists to identify the species therein but many remain unidentified due to their botanical inaccuracies. I disagree with the authors of *Codex Witsenii* (2002) who have related *Fig. 14* –identified as *P. incrassatum* (Andrews) *Sims* (*Geraniaceae*)[21] to *Fig. 17* identified in Waterhouse as *P. trifidum* (Willd.)[22] and Burman gives his identification as *Pelargonium rapaceum, foliis ternis, trilobatis & tridentatis, flore sanguinco.*[23] K. H. Barnard also supports the comparison between *Figs. 14, 16 and 17* (Barnard 1947: 11). I however disagree with the comparison. Petiver gives his description as *Geranium radice Rapacae, flore sanguineo.* I think that these illustrations can be separated into three distinct groups (*Figs. 14–16, Figs. 17–18* and *Figs. 19a–19b*), possibly representing two or three different species.[24] I base my observations of the number of stamens and on the groups' visual similarities (number and arrangement of flowers). These examples demonstrate the confusing nature of these depictions, probably caused by a lack of understanding of the subtleties of plant identification. Mistakes were therefore transcribed into the engravings that are considered the iconotypes for species that first appeared in important botanical publications such as Burman's *Rariorum Africanarum plantrum decades* (1738–39) and Petiver's *Gazophylacium Naturae and Artis* (1691).

Figs. 15 & 16 show a fairly common device of copied sketches; parts of the image are mirrored (the tuber and floral arrangement). I think it is possible that this was an intentional device designed to make each copy an "original". In other words, each copy that was made was not a completely faithful tracing of the sketch being copied. The stems also depict flowers in several different stages of flowering (bud, open flower and flower stalk) and this does not occur in nature, but is clearly intended to show these mutations on one sketch, thus confirming the inherent illusionism of these works. *Fig. 18* comes from *Ms. germ. Qu. 238* and looks very similar to the *Fagel Manuscript* illustration, the composition has merely been altered and the botanical details faithfully transcribed. It therefore seems likely that the *Fagel Ms.* was the source for the *Ms. Germ Qu. 238* drawings. This supports my assessment that each folio of copied drawings were intentionally altered in an attempt at creating "original" volumes of sketches that were considered so valuable because they were supposed to have been "drawn directly from nature".

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[21] "They concluded, however, that it was not an uintjie (little onion) or bulbous plant but, on the evidence of the uintjie annotation of the illustration with the Van der Stel journal, a tuberous-rooted plant and thus Smith's Pelargonium bilfolium although it should have been the species illustrated in TCD 869 and here" (Wilson, Van Hove-Exalto & Van Rijssen 2002: 63).

[22] Dr E. M. Marais says: "According to *Pelargoniums of Southern Africa* Vol. 3 *P. trifidum Jacq.* is *P. trifidum Jacq.* In *Pelargoniums of Southern Africa* Vol. 1 page 15 it is given as a synonym for *P. fragile.* The correct name is *P. trifidum Jacq.* and *P. fragile* is the synonym. I just follow Piet Vorster here. I trust him here" (Dr. E. M. Marais personal email: Cape Town 14/08/06).

[23] Dr. Marais gave this reply: "According to Piet Vorster's *Pelargoniums of Southern Africa Vol. 3, P. trifidum* Jacq. is *P. trifidum* Jacq. In *Pelargoniums of Southern Africa Vol. 1* it is given as a synonym for *P. fragile".* She states that "the correct name is *P. trifidum* Jacq. and *P. fragile* is the synonym" (Dr. E. M. Marais, personal e-mail, Stellenbosch, 14 August 2006).

[24] Dr E. M. Marais says that these *Pelargoniums* fall into section *Hoarea* and there is no species in the section with six fertile stamens.

Petiver owned the volume (*Manuscript No. 88*, Natural History Museum, London) that *Fig. 19a* comes from and Edwards has made comparisons between this document and his publication *Gazophylacium Naturae and Artis* (Edwards 1968: 243–246) pictured in *Fig. 19b*. It seems very likely that *Fig. 19a* was the sketch used for this engraving. The subtle distortions and changes in proportion between *Figs. 19 a–c* are noticeable when one compares the three illustrations, showing how each successive copy creates a modification to the last image and becomes a lesser imitation of the original. The mutations between each version of an image weaken the "truth" of the image in reflecting "nature".

What these drawings illustrate is the highly interpretive qualities of the individual artist tasked with copying them, either directly from "nature", or from another drawing. The intonation of the artistic eye and the foibles of human error cannot be suppressed or controlled. This is perhaps the essential paradox of any art form that aims to service science.

There are definite patterns to the copies I have looked at, these relate historically to the people that had contact with one another. Gordon and Masson, for example, did a number of short trips together (Gunn 1981: 171, Cullinan 1992: 159, Forbes 1965: 38). It is likely that they helped each another by sharing drawings. This is substantiated by the fact that almost identical copies of *Hoodia gordonii* (*Figs. 20 and 21*) exist in Masson's drawings in the Natural History Museum, London and Gordon's drawings in the *Rijkskabinet*, Rijks Museum, Amsterdam. When comparing the three versions of *Hoodia gordonii* in *Figs. 20–22* many similarities are noted between them (one has to discount the colour here because the Cullinan book has been reproduced with a slant towards yellow). The first sketch from Masson's drawings and the second sketch of Gordon's in the *Rijkskabinet* look like copies of one another although Masson's lacks the detail present in the Gordon drawing. It is hard to determine which drawing is the first generation, although according to Gunn and Codd: "It appears that some of Gordon's illustrations were used by contemporary travellers, e.g. Paterson, Masson and LeVaillant" (Gunn & Codd 1981: 171). If this is true then we can assume that Masson's sketch is based on the Gordon sketch, which makes sense because it is more detailed and it seems unlikely that a second-generation sketch would contain more detail. However, we can assume that it is the less detailed sketch *(Fig. 20)* that belonged to Masson that it was used as the reference for the engraving that appears in Masson's *Stapeliae Novae* (1796–7) *Fig. 22*. Masson who saw the actual plant would have assisted the engraver. However the book was published 22 years after Masson left South Africa in 1774. Masson did make a second journey to South Africa between 1786–95 but was restricted in his movements: "The sole intention of my second visit to the Cape being to furnish the Royal Garden at Kew with living plants, and as the mountains and the southern parts abound more with beautiful *Frutices* than the dry parched mountains of the interior parts, I had orders to confine my investigation chiefly to them" (Masson cited in Forbes 1965: 37). *Hoodia gordonii* is only found in the extremely dry northern regions of South Africa, so it seems likely that the drawing originated from his first trip to South Africa between 1772 and 1774. This demonstrates the amount of conjecture, improvisation and imagination that engravers had to use when interpreting field sketches into engravings. It also illustrates the important role the sketches played in assisting botanists to remember plants,

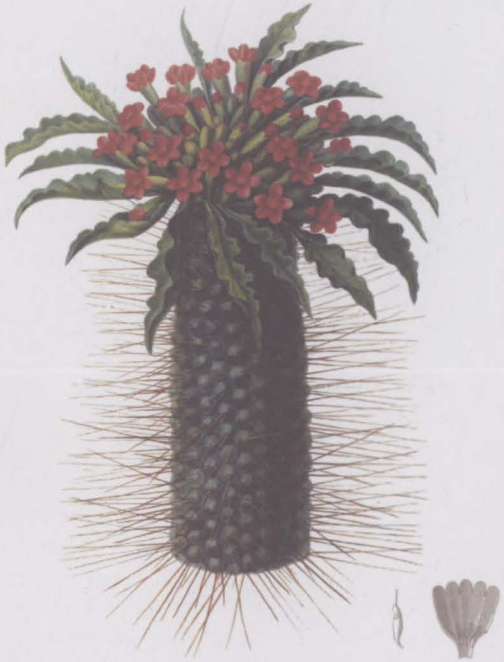


Fig. 23. Robert Jacob Gordon (possibly), *Pachypodium namaquanum* (c. 1779). Watercolour on paper. Collection: *LeVaillant collection Plate 164*, Library of Parliament, Cape Town. (Arnold 2001: 35; Plate 17).

Fig. 24. Signed Webber, *Pachypodium namaquanarum* (c. 1775). Watercolour and pencil on paper, 385 x 280 mm. Collection: *A collection of drawings by Francis Masson*, no. 40. Botany Library, Natural History Museum, London.

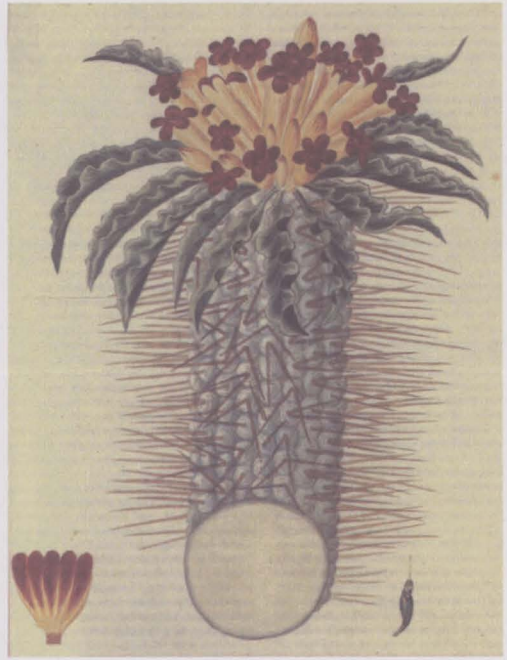


Fig. 25. Johannes Schumacher (possibly), *Pachypodium namaquanarum* (c.1775). Watercolour on paper. Collection: *Gordon Atlas RM 26. Rijksprentenkabinet*, Rijksmuseum, Amsterdam. (Cullinan 1992: 110; 47).

Fig. 26. Engraver unknown, *Pentandra monogynia: From the Great Nimaqua Land* (1789). Hand-coloured engraving on paper, 210 x 280mm. (Paterson 1789: 124).

Fig. 27. Artist unknown, *Stapelia* (c. 1685). Watercolour on paper, 310 x 195mm. (Gunn & Du Plessis 1978: 141; Plate 59).

From a volume entitled *Flora Capensis* that was bound and belonged to Johann Phillip Breyne.

Fig. 28. Artist unknown. *Stapeliae Dec. pl. Afric: Tab. 12 Fig. 2* (1755). Watercolour on paper, 260 x 365 mm. Collection: Burman, Johannes. 1755. *Afbeeldinge van enige Caapsche gewassen, dogh meest bloembollen, waarbij ik de Latijnsche naamen geschreven heb.* Mary Gunn Library, South African National Biodiversity Institute, Pretoria.
The annotations once again correspond to *Rariorum Africanarum plantrum decades.*

Fig. 29. Artist unknown, *Stapelia foliis oblongis, dentatis, flore glabro intus sulphuroe, punctato extus purpureo, striato* (1738–39). Printed engraving. (Burman 1738–39: 29; *Tab. 12 Fig. 2*).

The engraving is always a mirror image of the original drawing. The image has been distorted to fit it one the page and make it look pleasing with the other illustration.

especially when publications sometimes appeared many years after journeys were completed. Small modulations and alterations in botanical drawing can affect the ability of a botanist to identify a plant, and when an engraver had to "make up" details left out of drawings, as in this case, that changes and inaccuracies were bound to occur.

The *Pachypodium namaquanum* pictured in *Fig. 23–26* possibly share a similar history to those of the *Hoodia gordonii* sketches. The drawing from Masson's sketches (*Fig. 24*) appears to be based on the finer *Gordon Atlas* drawing (*Fig. 25*), but has some differences, mainly in colouration and composition. The composition was probably changed due to the aesthetic considerations of the artist that copied the drawing. The key feature that made me put them together is the inclusion of the identical flower dissection in the drawing. The Paterson engraving is clearly copied from the Gordon sketch and it is interesting to see how the image changes from the watercolour version to the engraved one. The flattening and codifying of the visual language is clearly represented by the example.

The drawing of a *Stapeliae* in *Fig. 27* is from a bound volume *The Flora Capensis*, in the Brenthurst library, was made for Jakob and Phillip Breyne. Gunn and Du Plessis say this volume could be an original set painted at the Cape: "Just below many of the paintings in this volume on the right hand side of the plant, is a number that corresponds exactly with the page numbers of the three florilegia in the NBI Library [sic], the Bodlein Library and the *Rijksherbarium* in Leiden" (Gunn & Du Plessis 1978: 30). The second drawing *Fig. 28* is from the volume *Afbeeldinge van enige Caapsche gewassen, dogh meest bloembollen, waarbij ik de Latijnsche naamen geschreven heb* (1755) owned by Burman (Mary Gunn Library, Pretoria). These two drawings are clearly copies of one another. There is again a loss in the accuracy of the colour the leaves of *Fig. 27* are not tipped with red as they are in *Fig. 28*. Yet the flower of the former is more detailed and sensitively handled. The copies imply an historical link between Burman and the Breyne brothers.

Conclusion

Not only did the "universal" system of taxonomy allow botanists to bring to order the overwhelming array of conflicting botanical names, it also was intended to probe the mind of God, to discover His providential plan. Hence the structure of botanical discursive practices emerged from a specific conception of "nature" that was influenced by socio-political and religious circumstances. Natural history was constituted in and through language schemes like Linnaeus's binominal nomenclature. As these schemes developed Europe's technological capacities were challenged to meet "the demand for better means of preserving, transporting, displaying, and documenting specimens" (Pratt 1992: 29). Botanical illustration was an artistic specialisation designed to meet the needs taxonomic order imposed. Images of plants were often the only versions of "in tact" nature to reach the natural philosophers, and these were limited by the artistic ability of the artists that made them. Botanical art embraced science by striving for the most accurate representation of a plant that was possible, this goal served the needs of the botanist. Botany informed botanical art, and the paintings were produced to support

and validify the theories within its discourse. At the same time, however, the images created of natural phenomena were not really verifiable by scientific formulae and deductive reasoning; instead they are specific interpretations by artists who engaged their own judgment and reasoning when drawing the images. The artist is generally not interested in equating how they perceive, say colour for example, to a mathematical formula. Their interpretation of the "truth" adheres to different criteria entirely. This is perhaps one of the contributing reasons as to why the artists of this era were unacknowledged – in order to assert the authority of the "scientific" text the notion of artistic interpretation was downplayed by failing to name the artists. Eric Forbes says:

> These subjective elements, so necessary to the creation of artistic productions, are generally regarded as inadmissible in the currently accepted method of scientific enquiry. It seems to me, however, that a creative scientist likewise requires a leap of imaginative insight in order to transcend the realm of experience from which his generalisations have been derived, and that the fundamental dichotomy lies rather in the inadequacy – as opposed to the error – of the scientist's approach (1989: 14).

The use of botanical Latin excluded women from understanding botany it also excluded indigenous knowledge that was regarded as being "barbarous". The lack of records regarding both the authorship of these drawings and the guides that showed "explorers" plants, reflects the self-centred Eurocentric conception of the world. The European regarded his role as superior to his artist and guides and this is what has been preserved in texts.

Illustrations have been shown to be highly subjective, schematic representations of the "truth". "Truth" is understood as emerging from an ordered set of schemes that are controlled and regulated by the people that invent them. These schemes become a power base from which knowledge is controlled, regulated and carefully disseminated to an elite audience. Once "nature" had been neatly categorised it became deployed into a new European knowledge formation. "Here the naming, the representing, and the claiming are one; the naming brings the reality of order into being" (Pratt 1992: 33). Marginalised groups like women and indigenous people were purposefully excluded from the production and consumption of knowledge. This has had deep consequences on how science has advanced and how science is perceived today. Scientists need to take heed of the cultural influences and power structures that have shaped the discipline.

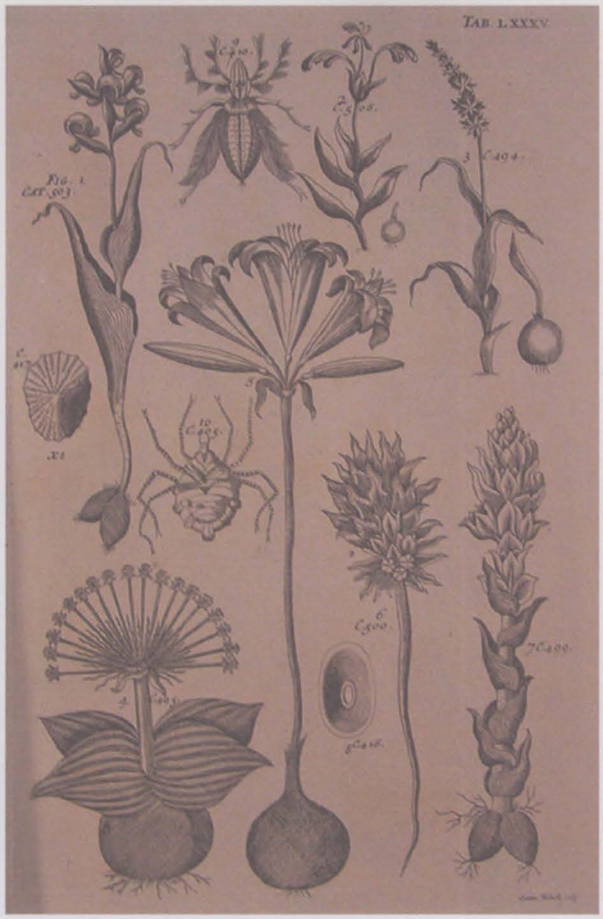
Chapter 4: Cultural and scientific ideology that influenced curiosity collecting in South Africa

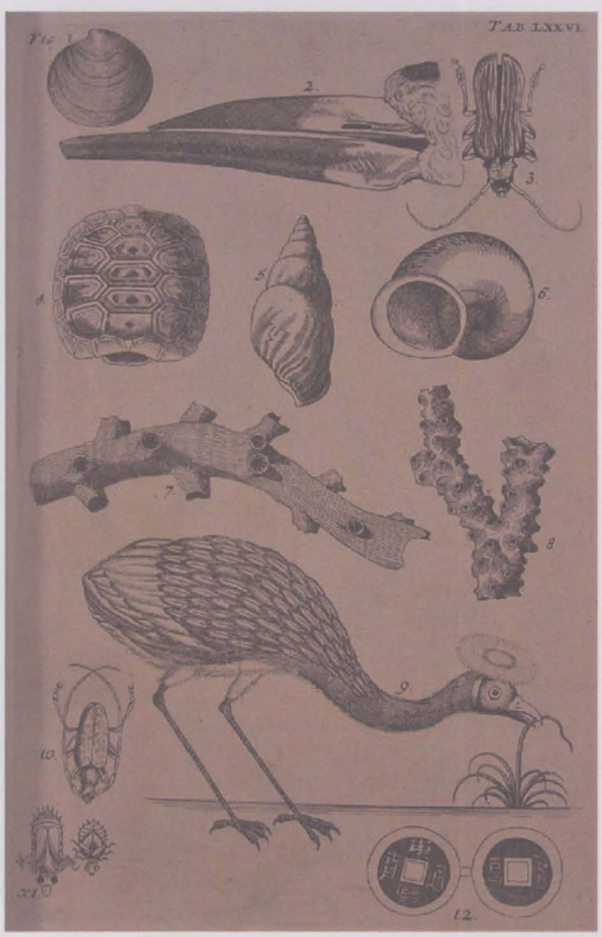
In this chapter I establish the relationship between curiosity collections and the production of knowledge. These findings are presented as part of my practical component, and I discuss the influence they had on my work. Curiosity collections that typified seventeenth– and early eighteenth–century intellectual life are important in my investigation because they embody many European ideas and attitudes towards both science and Africa. In the introduction to the catalogue of their exhibition *Curiosity CLXXV: A paper cabinet* (2004), artists Skotness, Langerman and Van Embden sum up how sixteenth–century curiosity collections reveal that rationality was secondary to inspiring wonderment:

> The Renaissance cabinet with all its diversity could be interpreted as a microcosm of the known universe. The arrangement of objects within these cabinets, however, was not intended to simulate the order of nature but was governed mainly by outward appearances. Divination, signs and wonders prevailed over rational argument and deduction. During the eighteenth century the intellectual environment of the Enlightenment fundamentally changed the way knowledge was constructed. Systematic order, empirical methods of observation, classification and description, brought the miscellany of known things into an emerging framework of scientific discipline and discourse (2004: 14).

It is important to remember that eighteenth–century "scientific" collections had their roots in curiosity collections and modern scientific specimen collections therefore bear the traces of this history. These highly constructed seventeenth–century displays of artefacts and specimens provided a record of the early practices of annotation and display that gave rise to the scientific collections and collecting practices of the later eighteenth century. Collectors of Cape flora in the seventeenth and early eighteenth centuries were in part motivated by the desire to gain financially from discoveries of commercially viable plants; this was often coupled with the lust for personal recognition and prestige (Weltz 2001: 8). Commercial and social desires influenced the way in which collections were made: there was a taste or fashion for the most peculiar, strange objects. The various curiosity collections influenced the way in which European society looked at, understood and eventually judged the "new worlds". My practical work argues against Eurocentrism and encourages the inclusion of African perspectives into botanical knowledge. The Europeans that "explored" Africa and the "new world" discarded indigenous wisdom because they felt it was inferior to theirs. Indigenous knowledge was seen as embodying myths and was bereft of the civilizing influence of empirical observation. The fact that indigenous perspectives were excluded from botanical nomenclature is one example of "othering" that reflects the racist ideas of the seventeenth– and eighteenth–century botanical "explorers". These ideas are subtly expressed in the artworks made of plants in this era. These schematic representations of "nature" were painted "after life" (*naer het leven*, in Dutch) according to the Renaissance tradition[25], and by inference claimed that these were empirical observations of "nature". Once an image had been processed through the eyes and hand of a

[25] Alpers says: "Although drawing 'after life' was an established procedure in the making of images in Renaissance art in the West, Hoogstraten's emphasis on the attentive eye is distinctive" (1983: 76).





Figs. 30a and 30b. Engraver unknown, *Tab. XXXV & Tab. LXXVI* (1767).
(Petiver 1767: *Tab. XXXV & Tab. LXXVI*).

From James Petiver's publication *Jacobi Petiveri Opera, historiam naturalem spectantia: containing several thousand figures of birds, beasts, fish, reptiles, insects, shells, corals, and fossils: also of trees, shrubs, herbs, fruits, fungus's, mosses, sea-weeds, &c. from all parts, adapted to Ray's History of Plants, on above three hundred copperplates, with English and Latin names* ...", London: printed for John Millan, Bookseller. 2 Vols. This is the 2nd editon of the text as the previous was published in 1764.

The examples show the odd, eccentric arrangement of specimens designed to excite interest and inspire wonder rather than to adhere to a taxonomic order.

European it gained "scientific credibility", hence Gordon's wife's assertion that all his artworks were "designed by her own husband, who drew every outline, and had them finished under his own eye" (Cullinan 1992: 11).

In his thesis Keith Dietrich makes a parallel argument to mine about how images (in his case of people) function as ambassadors of "othering" that eventually result in deeply racist or xenophobic attitudes to those of other nations:

> Ethnocentrism, the tendency to take one's own group as the norm, can be regarded as a universal phenomenon and stereotyping could be seen as a common cognitive process which enables humans to make sense of new events. But because of the dominance of Western European culture in world affairs, the remarkable success of its discourse in affecting the way other cultures see themselves in relation to it, and especially the arrogant assumption that its proponents were (or are) more 'civilised', less 'superstitious', more 'humane', more 'advanced', more 'rational' and 'scientific' than other 'less developed' cultures, this form of ethnocentrism has had a determining effect on the self-image of Other societies who are subjected to it (1993: 5).

Awe and wonderment in a cabinet

The acquisition, examination and display of collections were pursuits that allowed communities of collectors to meet and exchange ideas and objects from the sixteenth through to the eighteenth centuries (Terpak 2001: 148). Some curiosity collections were open to the public and were considered places where people could go to appreciate all of God's creation (Whitaker 1996: 81). Visiting curiosity collections was popular and was considered a valuable social and scientific activity that stimulated discussion and debate about "nature". The curio cabinet, or *Wunderkammer,* as it was sometimes called, became a way of showing God's miracles from around the world. Curator Frances Terpak asserts the integral role that objects of "study and wonder" played in intellectual life around European studies of "nature".

> The paintings and cabinets of the period provide fine documentary evidence of this sometimes bewildering display of all kinds of examples, of *naturalia* as well as specimens of the material culture of recently discovered civilizations. It marked an attempt to create an allegorical cosmos that would permit the viewers to take pleasure in a fanciful, and much condensed, view of a good part of the entire universe (Muensterberger 1994: 189).

The published engravings inspired by these collections were designed to astonish and impress audiences. The publication *Jacobi Petiveri Opera, historiam naturalem spectantia: containing several thousand figures of birds, beasts, fish, reptiles, insects, shells, corals, and fossils: also of trees, shrubs, herbs, fruits, fungus's, mosses, sea-weeds, &c. from all parts, adapted to Ray's History of Plants, on above three hundred copperplates, with English and Latin names* (1767) *Figs. 30a & b* for example, contains examples of objects that were randomly combined to incite amusement and do not adhere to any scientific scheme. The book entitled *Cabinet of natural curiosities: locupletissimi rerum naturalium thesauri 1734–1765* (2001) is based on the copy in the *Koninklijke Bibliotheek*, in the Hague of the eighteenth–century apothecary Albertus Seba's collection of engravings of his curiosity collection. Engraved plates juxtapose the oddest

combinations of living things and there is no obvious logic or taxonomy applied to the compositions. These works betray the intention to inspire a sense of wonderment in "nature".

This form of scholarship was committed to knowledge that was "discovered" rather than "produced" (Shepard 2002: 127). It is necessary to expose the thinking that tends to naturalise notions that serve a particular conception of the world. In *Archeology of knowledge* (1972) Foucault introduced this idea. He described the subliminal rules and structures that governed scientific theories of individual thinkers (Macey 2001: 19). Foucault asserted that knowledge is actively produced and contains traces of social and political bias and is therefore never received in an unadulterated form. Muensterberger elaborates on this theme:

> The scenario then, within wide variations, is the potent and in some ways quite novel attitude toward knowledge, but not knowledge per se. It was knowledge correlated with method and an intellectual delight in classification and order. No longer did the aficionados talk of *miracula* and *mirabilia*. Instead they divided objects into *antiquitas, artificialia*, and *naturalia*. Such initial attempts at organising categories were probably meant to assist the early collectors of all kinds of specimens to divide their possessions into different sections (1994: 188).

Curiosity collections were status symbols, signifying the wealth, knowledge and power of the people who owned them (Terpak 2001: 153). Owning an impressive collection was equated with having attained wisdom. Pearce maintains that, although the observation and arrangement of collected items would yield its inherent knowledge, collections did not merely demonstrate knowledge, but were considered to be knowledge itself (Pearce 1985: 111).

In *Devices of Wonder* (2001) Stafford says: "The cosmos as displayed in the *Kunstkammer* was not so much a static tableau to be contemplated as it was a drama of possible relationships to be explored" (2001: 6). The collections were a reflection of the ideas and desires of their culture. Through them the culture's central themes were expounded, tested and analysed in a public space. It is in this arena that ideas gain credibility and knowledge is "produced". The notion that knowledge becomes universally accepted and dispels superstitious beliefs is in-line with the "grand narrative" of the Enlightenment. Knowledge becomes legitimised through the discursive practices, like specimen collection and display that are associated with botany.

Curiosity collecting: fantasy disguised as science?

The role of curiosity collecting evolved and changed in the eighteenth century to suit the needs of a discipline in flux. Yet at the heart of the matter, there still remained the residue of imperialist ideas. I argue that imperialist agendas undermined the scientific integrity of many collections. This argument is supported by the evidenced crisis that national museums of natural history are undergoing this century.[26] Scientific writer James Secord says: "The English comparative anatomist Richard Owen dreamed in 1859 that the collections of the British nation

[26] Secord claims that that the Natural History Museum and London Zoo have had to radically rethink their functions, and in the light of serious funding cuts have been forced to stategise their priorities towards commercial goals (1996: 452).

would eventually exhibit all the species of the globe... These were imperial fantasies, utopian projects for a culture of natural history that would expand forever" (1996: 447). Collecting reached frenzied proportions in the eighteenth and nineteenth centuries. Collectors exterminated species of plants by over-collecting.

Muensterberger explores the psychological aspects of collecting and claims that collecting has its roots in a deep-seated sense of loss experienced during childhood that therefore undermines the person's confidence: "After the collector has found a new object or made another acquisition, it seems to serve as an acknowledgment of his worth, at least consciously and for a while. Meantime he no longer feels haunted by self-doubt" (1994: 252). This gives an interesting background for an enquiry concerning the loss of identity that could have been present in England during a time when it was changing and radically expanding its empire. Collections of nature and artifacts not only provided evidence of their exploits, but they also served to acknowledge their worth, stemming any feelings of inadequacy that may have arisen from the exploitation of the colonies.

As the seventeenth century drew to a close and collections that had "science" at their centre began to dominate collector's time. These collections also served to legitimate collecting practices, and science was seen as the "superior" discipline to collect for. The era of collecting for the amusement of the bored was ending.

> It should be noted at this point that even encyclopedic collections are representative of their owner's individual approach and slant. One of the most telling contemporary descriptions of the curio-cabinet refers to it as the *Vernunfft-Kammer*, or the Room (or Cabinet) of Reason. Such a designation clearly reveals an owner's ideological bent, seeming to imply that occultism, fantasy, and allegory were to be replaced by visible and tangible records and reality (Muensterberger 1994: 190).

The above quotation reveals a significant shift in attitude – the role of collections was transformed from entertainment towards focused scientific study. Banks, a prolific collector, had very different ideas about how his collection of plants could be utilised for the advancement of science:

> The idea behind the Banksian collection and library was indeed of another 'order': that of pure science. Banks collected with a strictly scientific purpose, neither to amuse nor to edify, but simply for the sake of research. ... This scientific idea fitted the early romantic movement; it had evolved from the ideas of the Enlightenment on nature, but it had outgrown the emphasis on direct utility and, even more, that on edifying pleasure. The Banksian concept of scientific botany was of individual exploration accompanied by pure research (Stafleu 1971: 233).

Banks's collection was the largest of its time and is now housed at the Natural History Museum, London, and apparently did not grow much after his death in 1820.[27] The Natural History

[27] "The number of species in the 'arranged herbarium' (in accordance with the Linnaean system) was then 23 400, and there were a suspected 5 000 additional species in the 'unarranged' section, which included herbaria in book form, such as that of Paulus Hermann, as well as 1 700 parcels of unsorted material" (Stafleu 1971: 235).

Museum, London, set up its own botany department for the reception of the Banksian collection in 1820.[28] *The Royal Society* endorsed the "new" role these collections could play in scientific process:

> If the first generation of Royal Society scientists held firmly to Bacon's prescription that scientific procedure starts with observation and collection, the idea of collections is interesting in itself. We normally think of collections of things, e.g. butterflies, stamps old bottles coins, manuscripts and of course these are akin to the collections of plants and animals being made by explorers and naturalists, as well as the collections of the Royal Society which needed, as Hooke put it, a repository (Slaughter 1998: 8).

The grandiose, imperialist visions of Linnaeus, Banks and their contemporaries have had further-reaching benefits and consequences in our century. The herbarium collections started by them and which are housed in various international herbaria are used almost exclusively for research by botanists. Natural history is intimately tied to and reflects the agendas of the cultures which produce it and as Secord writes: "Historical analysis can also show how these issues of status, and the practice of the natural sciences more generally, have always been embedded within wider political discussions about gender, class and expertise" (1996: 458). Acknowledging and contextualising and not merely rejecting these perspectives, as written in European history books, will ultimately lead to deeper insights about current dilemmas regarding natural history. For our understanding of natural history to progress we need to incorporate more culturally diverse perspectives and reveal those that are inherently racist, sexist and imperialist. "We have not only inherited our institutions and practices, but our problems: and these need to be understood as products of history" (Secord 1996: 459).

Botanical art: The hybrid art

The intentions that motivate collecting, in conjunction with the complex positioning of botanical art between science and art, create all kinds of interesting juxtapositions. The purpose of my personal exploration through the vehicle of my work will be to determine the role that both scientific and cultural practices play in influencing the conventions associated with botanical illustration. It is an art form that challenges the boundaries between the two disciplines, yet few artists have consciously set out to change the view that these disciplines are opposites. Because of its link to the sciences, botanical art claims to embody an objective habit of mind. Yet the creative process of making and consuming images inextricably changes how "nature" is viewed. Arnold comments on the location of this art form between disciplines:

> Plant portraiture is influenced by the fact that it is a hybrid art located within two theoretical discourses – the science of botany, and the visual arts. This gives plant portraits complicated identities and establishes different contexts where meaning operates. While

[28] From *The Natural History Museum at South Kensington* (Stearn, 1981) "Two major collections, those of Sir Hans Sloane (1660-1753) and Sir Joseph Banks (1743-1820), both long-serving Presidents of the Royal Society, form the historic basis of the Department of Botany. ... Thus in 1827 Brown agreed to the transfer of the Banks herbarium and library to Bloomsbury and he was officially appointed Under-Librarian with the designation of Keeper of the Sir Joseph Banks Botanical Collection (the Banksian Collection)". The natural history collections were moved from the British Museum (Bloomsbury) to the newly built Natural History Museum (South Kensington) in 1881 with a Botany Department in place.

> science claims to be concerned with intellectual objectivity and empirical reality, art aims to move the mind through imagination and senses (Arnold 2001: 20).

Linnaeus recognised the importance of illustration and in *Philosophia Botanica* (1751) he states that illustrations must be of natural size and show the parts of the plants (Stafleu 1971: 37). The plant images advocated by Linnaeus present an isolated, detached version of a plant that has been removed from the intricate context and process of life. A contemporary practice explains this: the specimens that are chosen for the purposes of illustration are supposed to be archetypal; they must represent some kind of average within the species. Thus, before the artwork is begun, a careful intellectual and selective process has commenced.

The artwork becomes a visual code and enters into the rational domain of the botanist (Slaughter 1989: 10). If, for example, one takes the *Pelargonium* (*Figs. 14 & 15*) depicted in and discussed in the last Chapter, each copied drawing is shown from the same angle, frozen at a particular moment within the life cycle of the plant. The leaves are bent forwards to show the margins clearly and the buds are splayed out to show each one separately and on a flat plane. These plants do not look like this in the flesh, as the flowers are arranged in whorls and not symmetrically on flat planes. In the drawing, flowers are depicted in different stages of bud on one stem but this is a somewhat artificial arrangement. These devices transform the painting into a codified system of representation. It allows for as much botanical information as possible without cluttering up the drawing with unnecessary leaves, stems and buds. All the drawings I have researched have this flattened and codified quality. They remind me of plants on herbarium sheets where each stem is carefully separated, taped down, pressed and dried. These paintings, although they appear to be naturalistic, are actually highly manipulated, abstract representations of "nature". These images of plants are in many ways diagrammatic and represented in symbolic ways, yet they claim to be faithful transcriptions of "nature". As botany progresses into new areas – DNA testing and improved microscope technology – artists will have to re-evaluate how plants have been traditionally depicted. This could potentially revitalise botanical art, change perceptions and allow the discipline to expand and meet the needs of the current era.

Botanical art: fertile ground for stigmatisation?

Postmodern critique has managed to tackle, challenge and sometimes redefine the role and definitions of many aspects of art including "illustration", yet there is a negative stigmatisation that permeates botanical art (Arnold 2001: 148). Botanical art is seen as an inferior art form because it provides a service to science, and is therefore seen to be lacking in "artistic" integrity. Artists are seen as silenced collaborators who contribute towards the legitimising of scientific theory. Artists are traditionally seen as playing a largely subordinate role to the botanists who construct the "rules" associated with botany. Arnold says: "In many instances the text/image relationship is weighted in favour of the writer: the artist is seen not as a collaborator of equal stature with the botanist, but rather as the subordinate player whose sole purpose is to serve science in the printed form" (Arnold 2001: 146). Botanical art exists within

the strong web of reason that constitutes scientific episteme and one is not encouraged to question its "grand narrative". Artists and botanists working within the discipline do not acknowledge the limitations of the art form in reflecting empirical "truths" and this leads to the creation of images that rely on tradition rather than innovation.

Contrary to Arnold's assertion made in the above paragraph, I think the relationship that develops between the botanist and the illustrator is often based on mutual respect. The respect afforded by botanists towards botanical artists is demonstrated by the following example: botanist Dr. E. M. Marais named one of her species after the botanical artist Ellaphie Ward-Hillhorst, who painted many of the species she first described. The plant is called *Pelargonium ellaphieae* and was described in 1981. This name was given to acknowledge the important contribution that Ward-Hillhorst had made towards botany.

The negative stigma of botanical art is in my opinion generated from within the fine art community. The art world perceives that when an artist "serves" as a visual collaborator of scientific theory, that the relationship is automatically stilted towards the scientist, who it is assumed, plays the "superior" role. I tend to disagree with this notion. In my experience botanists who commission artwork do so in the spirit of collaboration, and not of indoctrination or subordination. While the artwork still may reflect the scientific ideas of the science of botany, the relationship is based on deferral to the greater expertise of one over the other in certain matters and this is not always weighted in favour of the botanist.

It appears that botanical art is not taken seriously as an art form by the fine art discipline. In an attempt to gain insight into this problem, I asked artist Lyndi Sales, who makes botanicals "on the sly", why she thought there was a negative stigma associated with the art form. This was her response: "I think the negative stigma comes from the fact that botanicals are not challenging in subject or process. ... I too try to create art works [here she is referring to her fine art prints, not her botanicals] that are unique and to a smaller degree challenging. Botanicals come from a much older tradition and for that reason seem to have a negative association. I've kept my botanical line apart from my fine art work and in fact wanted to sign the works under a pseudonym... The South African market is somewhat unaware of this other line and I was hoping to keep it that way" (Lyndi Sales, personal correspondence, 10 October 2006). Sales is worried that if the fine art world gets wind of her clandestine "botanical" activities, it may compromise her status as a fine artist. This reveals quite a burden of negative stigma and it is also evidenced by botanical art collections being held in strange physical locations: in the draws of herbaria; stored away in musty folders in long-forgotten archives of museums; locked away in the shelves of libraries; and secreted in the private collections of a few eccentric collectors. Seldom do botanical artworks make it into huge retrospective exhibitions held in world-renowned museums. The art form is collected and purchased by a handful of enthusiasts around the world. Botanical art does not form part of the collections of major international art galleries. "Botanical art and illustration have been allowed to remain in the realm of science, under-researched by art historians, undervalued by art theorists and critics and uncollected by art institutions, and seldom exhibited in art galleries" (Arnold 2001: 148). This all adds to botanical

art's stigma that implies that " 'illustrative' images – because they relate to texts – lack the visual autonomy so highly prized by Modernist theory" (Arnold 2001: 148). To some, the fact that botanical art services science, further removes its implicit "artistic" integrity.

The *Kirstenbosch Biennale* is one of the most important local showcases of botanical art in South Africa. The exhibition gives a face to contemporary botanical art practice and yet embodies the modernist paradigm of botanical art. The following text extracted from the *2006 Kirstenbosch Biennale invitation to artists to submit work* is noteworthy in that it makes no mention of honouring the contribution artists have made to advancing both the art form and the requirements of botany: "In keeping with the vision of SANBI [South African National Biodiversity Institute], both to celebrate and to honour southern Africa's rich and varied floral heritage, the *Kirstenbosch Biennale* exhibits exclusively southern African flora" (M. Huntley, personal e-mail, Cape Town, 9 May 2006). The exhibition is designed to express the ideals of SANBI and lacks the intention to contribute to the development of botanical art in South Africa. This signifies a lack of willingness within the botanical community to change the set perceptions surrounding botanical art. While the exhibition does raise awareness about the artists who contribute to the discipline it is not the central aim of the show. The criteria by which the biennale is judged, (taken from the e-mailed invitation to artists), reveal what is considered important in evaluating artworks from the botanical genre:

> In judging the works, judges will look at: The botanical accuracy of the works; sensitivity in the rendition of the plants; the artist's painting and drafting skills; the composition of the paintings and the overall unity and aesthetic appeal of the exhibit (M. Huntley, personal e-mail, Cape Town, 9 May 2006).

The first item on the list of the evaluating criteria relates to the fulfilment of the scientific function of the work and all the other considerations are formal (draughtmanship, composition etc.). Neither the interpretive role nor individual innovations contributed by an artist to the discipline are acknowledged. The work is judged according to the modernist paradigm that inverts the role of the artist. Jardine and Spary reiterate the same opinion about current ways of representing "nature":

> Such simulacra are unambiguously representational: despite their intensity and reality they bear few, if any traces of the material objects and the human labour that went into them. Rather their impact depends largely on their success in conveying the scientific sophistication of their making. The more engaging and convincing the images, the more the viewer is led to take on and trust the reliability and authority of scientists and their technologies (1996: 12).

Botanical art needs to become more self-aware and acknowledge its limitations as scientific verity of its premises. The success of these images is based on the ability of the artist to create an illusion of "nature", and this leads to an over-emphasis on technical ability rather than the interpretive role that the artist plays. This forces the entrenchment of the genre into a tradition based on outmoded scientific needs that do little to meet the evolving needs of botany. This is further complicated by the disdain with which the fine art community regards the art form. The

negative stigmatisation of the botanical art needs to be reassessed and acknowledged so that it can redefine its place within the fine art field.

Simulacrum of botany: a discussion of their influence on the production of my practical work

This section determines how my practical work interacts with the ideas presented in this thesis. Through the vehicle of my work, I raise questions in the viewer's mind as to the use of botanical art as an accepted form of scientific discourse. I derive inspiration for my practical work from collections of curiosity and refer to and invert their meaning.

I will outline the process I have constructed to make my work. I have conducted research into medicinal and ritualistic plant usages by indigenous people and stories involving South African plants (many of which are taken from travel journals) and have selected images and texts from these sources. I select a story and assemble the research material. This includes 20 or so photographic images of the herbarium specimen of the particular plant, the anecdotal stories and medicinal properties of the plant. I have archived hundreds of photographs taken of herbarium sheets that I found in the collections of the Natural History Museum in London and the Bolus and Compton Herbaria in Cape Town. The herbarium sheet is a record of a living plant – but is dead, dried up and stuck down to a sheet of paper using acid-free tape. Taxonomists refer to these sheets when confirming a scientific enquiry and generally do not consult the living plant growing in the field.[29] The herbarium sheet represents the perfect embodiment of decontextualised "nature" that I discussed at length in Chapter 3. I carefully select the herbarium sheets that appeal to me and compose them into a photomontage using Photoshop, in this process I edit out all the information I do not wish to appear in the final painting.

Once I am satisfied with the image, I print it out and create a "copy" of the image (see *Fig. 33*). Using watercolour (a medium traditionally associated with botanical art making), I painstakingly reproduce all the labels, stamps, acid-free tape and signatures on the sheet (see *Fig. 34*). By copying herbarium sheets, I allude to the seventeenth– and eighteenth–century tradition of copying plant images. The process is designed to emphasise the fallibility of artistic interpretation and the copies may have mistakes transcribed into them by careless or conscious artistic manipulation. I then scan the completed image and place it into a page layout program where the image is assembled with the text, sketches, chemical composition diagrams and the like. Richards echoes my feelings when discussing his own work: "Often these object-images speak – or mumble inaudibly – of their lives, these images are copied, doubled, multiplied, reassembled... anatomised, decaying thoughts and feelings" (Richards 2002: n.p.).

[29] "[Thunberg's] herbarium is of immense importance as it constitutes the original material on which his extensive taxonomic publications are based. It remains a fundamental reference point for any taxonomic study of a Cape-based plant group and is still continuously consulted by botanists undertaking research in this field and who need to examine type specimens of Thunberg's names" (Forbes 1986: xx).

The collection which I call *Curiositii* has been built up over the year and has grown though fairly arbitrary means. It is based entirely on personal interest and whim, in my mind reflecting the method I have observed of how curiosity collections of yore were compiled. The process emphasises the personality of the collector and undermines the assumed scientific episteme of the collection. The complete collection is presented in the form of a loose-leafed book in a box, the presentation is meant to mimic loose-leaf herbarium sheets and the pages are unbound emphasising the tenuous link between text and image.

The specimens I use are unusual or have an interesting story often relating to their cultural uses.[30] My interest in these plants is based on their ethnographic associations and it through the telling of the stories people associate with the plant, that I reinscribe indigenous knowledge back into the over-all understanding of plants. In the last 50 years the question as to whether there is scientific value to indigenous plant classification has begun to be explored. Berlin, Breedlove and Raven, in their paper *General principals of classification and nomenclature in folk biology* (1973), claim to have identified similarities within principals of folk biological classification systems. Without getting bogged down by the details thereof, the paper is noteworthy because it proposes the serious study and understanding of folk taxonomies. Acknowledging that taxonomies existed in these cultures was a big step forward. These scientists were among the forerunners in the creation of what is now an area of botanical research known as folk taxonomy. I find "folk" a bit of an unsophisticated term with derogatory undertones. Despite the stated intentions of the field of study being to engage on a meaningful level with indigenous knowledge. I intend my work to raise debate about the writing out indigenous knowledge out of botanical taxonomic practices.

This personal process of collecting and investigating is intended to open up botanical art for scrutiny and to allow the audience to question the methods and social factors underpinning the production of the work. Attention is drawn to the uneasy nature of making "scientific" images. I wish to portray the complexity of plant portraiture as having multiple sites for meaning as a result of the unresolved tension between the claims of science and those of art. I concur with Arnold's view that: "Whilst science claims to be concerned with intellectual objectivity and empirical reality, art aims to move the mind through the imagination and senses" (2001: 20). By drawing upon a tradition of art making associated with science, I explore extent to which the images that are produced for the purposes of scientific study are interpreted and constructed. Botanical art is the perfect model for the complexity of meaning I allude to and question in my practical work because it straddles the two worlds of art and science.

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[30] In the last 50 years the question whether there is scientific value to indigenous plant classification has begun to be explored. In their paper *General principals of classification and nomenclature in folk biology* (1973) Berlin, Breedlove and Raven claim to have identified similarities within principals of folk biological classification systems. Without getting bogged down by the details thereof, the paper is noteworthy because it proposes the serious study and understanding of folk taxonomies. Acknowledging that taxonomies existed in these cultures was a big step forward. These scientists were among the forerunners in the creation of what is now an area of botanical research known as folk taxonomy. I find "folk" a bit of an unsophisticated term with derogatory undertones. Despite the stated intentions of the field of study being to engage on a meaningful level with indigenous knowledge.

Fig. 31. Example of a herbarium sheet from the collection of the Botany Department of the Natural History Museum, London.

This example demonstates the layered hisory of specimen collecting for *Disparis villosa.*

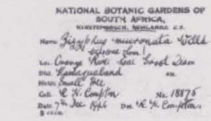
Fig. 32. Examples of stamps denoting ownership. They are taken from the Bolus and Compton Herbaria, Cape Town and the Natural History Museum, London, (this stamp bears the old name of the museum).

Fig. 33. Karen Stewart. *Sarcocaulon crassicaule (Geraniceae)* (2006). Photomontage executed in Photoshop, 210m x 297mm and printed on paper.

Fig. 34. Karen Stewart. *Sarcocaulon crassicaule (Geraniceae)* (2006). Watercolour on Waterford paper, 330 x 510mm.

Fig. 35. Collected by T. Cooper, *Ziziphus mucronata* (1826). Herbarium sheet. Collection: Herbarium of the Natural History Museum, London.

Fig. 36. Karen Stewart. *Ziziphus mucronata* (2006). Watercolour on Waterford paper, 330mm x 510mm.



Ziziphus mucronata mokgalo umphafa umlahlankosi buffalothorn blinkblaar-wag-'n-bietjie

Mkhuze game reserve situated in northern Zululand can be found at the end of a rough, potholed track. The hilly landscape is dotted with brightly painted mud-walled houses. I have always admired the fences that are patiently constructed out of gnarled dead wood woven together that surround some homesteads. Livestock, mainly the environmentally unfriendly goats are protected there at night.

The camp has changed since my childhood, the fabulous Zulu cooks whom used to magically transform simple ingredients like cabbage and tomato into delicious feasts are no longer employed there; but the familiar sight of small buck, acclimatised to the human presence graze close to the tents at dawn and dusk was comforting. We woke up early one morning to do a guided bush walk. Early mists rose about us as the first weak rays of sun filtered through, setting the dew wet dry yellow grass ablaze. The evocative smell that we had traveled so far for infused our nostrils fulfilling a primal sense of belonging.

The game was elusive that morning and we focused on birds, tracks and trees. I have always felt a deep connection to trees and felt my curiosity being stirred. 'What is this one called?' I enquired of our very well informed guide Jabulani. 'Now that is a very special tree to my people', he offered by way of reply. 'It is called the buffalo thorn tree, or Umlahlankosi in Zulu, the Latin name is Ziziphus mucronata. And he began to tell us the story about this tree.

The buffalo thorn tree is considered a medium for spirits to move between the physical world and the realm of the ancestral spirits. The tree is still widely used for the purpose of bringing home the spirit or soul of the dead who have passed away from their homesteads. It's status within Nguni society means that is enjoys
a certain degree of protection as the felling of the tree is associated with bad luck and is believed to cause drought.

Fig. 37. Karen Stewart. *Double page spread from artist's book: Curiositii* (2006). Archival ink jet print on rag paper, 660 x 510mm.

By copying herbarium sheets (*Fig. 31* is an example of a herbarium sheet) I allude to the seventeenth–century tradition of copying field sketches for the sale to botanists (discussed in Chapter 3). *Fig. 33* depicts a digitally composited image made from several herbarium sheets, the image is manipulated to meet my aesthetic requirements. If I am unhappy with an element in a herbarium sheet I exclude it. The final watercolour (see *Figs. 34 & 36*) is a copy of this digital montage and bears no obvious traces of the process of editing. The image appears to be a faithful copy of the original sheet. These images are set with texts derived from different sources, such as the travel journals, personal interviews, sketches and indigenous plant usage books.[31] This asserts the inter-textuality of the work. Through copying, the image contains traces of the other images from which it was produced. The resulting image (see *Fig. 37*) has thus gone through multiple mutations, none of which are openly apparent in the final work. I embrace my role as a *bricoleur* of scientific culture. I see the making of my art as a means of pulling together the disparate oddments left over from scientific endeavor. The text and image combine to re-establish the broken link between the anecdotal, historical and cultural associations of the plant. The manipulation of the image to suit my purposes is intended to evoke a parallel dialogue and critique that refers to the construction of botanical images made for science. The themes I elaborate on exist in the subtext of a wider culture of collection and display and already have their own meaning. I cobble together elements from herbarium sheets, scientific texts, journals, and stories relating to cultural practices associated with plants, into a rich tapestry.

The visual language I use for crafting my paintings originated in the Dutch art of describing. Seventeenth– century artists like Jan Vermeer excelled in this style as they attempted to capture "reality". According to art historian Svetlana Alpers, Samual van Hoogstraaten argued that painting was a study that represented all "the ideas of the visible world with the aim of fooling the eyes" (1983: 76). She goes on to say that: "[A]pparent resemblances can produce confusions in our perception of the separate and distinct identities of things" (1983: 77). The art associated with "fooling the eyes" challenges our perceptions. Through a complex process of representation the image assumes importance and acquires meaning through its relationship to "reality" (Arnold 2001: 22). Painting techniques are learnt, as are the ways in which audiences understand paintings. An image thus represents a complex exchange of social behaviour. We suspend our disbelief to allow the senses to "believe in" the image and this is how images that imitate "reality" gain credibility. In my work I challenge the suspension of disbelief and encourage the viewer to question the sociological factors behind the creation of the image. In *Simulacra and simulations,* philosopher Jean Baudrillard uses the example of cartography to explain his concept of simulacra, he says:

> The real is produced from miniaturised units, from matrices, memory banks and command models – and with these it can be reproduced an indefinite number of

[31] Briza has published a series of books based largely on *Khoikhoi* knowledge of plants. The authors B. E. van Wyk and N. Gericke say: "We hope to stimulate ongoing scientific documentation of indigenous knowledge for future generations, and most importantly, the application and benefication of this knowledge as instruments for sustainable development in the region. Innovative mechanisms need to be created to ensure that impoverished rural communities can share directly in the benefits arising from this commecialisation of this profound knowledge base" (Van Wyk & Gericke 2000: 7).

> times. It no longer has to be rational, since it is no longer measured against some ideal or negative instance. It is nothing more than operational. In fact, since it is no longer enveloped by an imaginary, it is no longer real at all (1988: 167).

I apply this concept to the images used in the study of botany. The "real" in my work is produced from the "memory banks" and "command models" of the herbariums. Herbarium sheets replace and are substituted for the actual plant, they relate to "nature" in the same way that a map relates to a city. The link is abstract, iconic and a codified representation of "reality". Herbarium sheets have an aesthetic allure despite the fact that they were never created with this intention. I find this embodiment of botanical collecting particularly appealing from a visual point-of-view. Herbarium sheets contain layers of many different people's work and describe the rich history of a specimen. If a specimen is reclassified, the renaming is recorded through stickers and annotations to the sheet. The sheets are stamped to encode various bits of information – whether the sample is a type specimen; whether it has been poisoned to kill insects; or whether it has been digitally categorised providing international access to the image. The stamps shown in *Fig. 32* identify which herbarium owns or owned the specimen sheet (the sheets are often exchanged between herbaria that seek sheets they do not currently own). All these visual elements are built up over time and the combined information forms a document that is valuable to botanists. The image thus replaces the living and breathing life form and the image produces "reality". "It is no longer a question of imitation, nor of reduplication, nor even of parody. It is rather a question of substituting signs of the real for the real itself; that is, an operation to deter every real process by its operational double..." (Baudrillard 1988: 167).

The removal of a plant from its original environment creates an emotional distance from the socio-political ramifications of this practice. In Slaughter's thesis she succinctly expresses the fragmentation that occurs when language is interpreted into other forms and this can be applied to the changes that occur when a plant is decontextualised from "nature" and interpreted into a drawing. To extend the metaphor; when a plant is taken out of its natural habitat, plastered onto a page, numbered, named, dated and put into a drawer in an institution 9 000 km away, not only does the plant die, but a kind of ideological death can be said to have taken place. By removing the indigenous cultural associations a plant inherits a new, Europeanised identity one that is controlled and constructed by the needs, wants and desires of the colonialist botanisers. While a herbarium sheet is a "real" object, it is also representational and my watercolour drawing of the herbarium sheet removes it one step further away from life. This process replicates the tradition of seventeenth–and eighteenth–century botanical illustration as I have experienced it.

Baudrillard reminds us of the political will behind the production of images and the problematic nature of any visual representation. He discussed the power Baroque votive imagery began to assume and commented: "Or is it volatilised into simulacra which alone deploy their pomp and power of fascination – the visible machinery of icons being substituted for the pure and intelligible Idea of God?" (1998: 169). "Behind the baroque of images hides the grey eminence of politics" (1998: 169). The way in which European botanists conducted their botanical studies reflected the arrogance of their colonial politics. The machinery of their icons, their herbarium

sheets, their illustrations and books were substituted for the plant, and served their own particular agendas.

Hoogstraaten echoed the seventeenth–century pre-occupation with regulating the senses when he cautioned the young artist of the eighteenth century against "taking on a mannered style by appealing to him to humble his brush and his hand to the eye so that the diversity of the individual things in the world can be represented" (Hoogstraaten cited in Alpers 1983: 77). It is perplexing when an artist attempts to faithfully replicate what is placed before him/her – there are many contradictions presented by the ideal of representing nature. The manner in which the individual experiences "reality" is governed by socially moulded perceptions that limits that person's ability to "universally" interpret. To illustrate this point Stafford uses the example of the decorative bias the Rococo period had on curiosity collecting. She emphasises the role cultural influences play in human endeavor:

> Although the scientific spirit was hostile to the fragile and idyllic creations of the Rococo, the period was rife with cabinets of natural history founded by avid collectors and artists. These were brimming with samples that showed nature complexly manifesting itself in picturesque forms of wood and stone. It is ironic that this playful view of science as a source of delectation helped, in the end, to impel ornament out of the aesthetic sphere into the living, growing world (1984: 11).

My practical work involves copying botanical devices like stamps and labels to enrich my images. I describe these elements as precisely as I am able to. I do this to emphasise the fact that the aesthetic principals of an artist can never be brought to order. Imagination and interpretation are integral to image making, no matter how "naturalistic" an image may seem. Bacon believed that "[a]rt does not simply imitate nature, nor is it a play of the imagination, but rather it is the *techné* or craft that enables us, through constraint, to grasp nature" (Alpers 1983: 104). The idea of hand-crafted images having the ability to methodically reflect "nature" is somewhat unrealistic and is based on entrenched, learnt patterns of behaviour. Bacon asserted that through the path of a methodical craft the intellect becomes enabled to understand "nature" and it is precisely this aspect of art-making that interests me. The more methodical and technically skilled the artist becomes, so the image also becomes more a convincing simulacrum. The artist is the vehicle through which the information is mediated and the interpreted image becomes the object of scientific scrutiny. In her essay *Petals and stigmas* (2001), Arnold concludes: "Plant portraits are cunning acts of transformation. The most pervasive images serve as analytical partners to scientific research, but they also detain the eye with their power to evoke the life force of nature through their presence as silent compelling aesthetic objects" (2001: 174).

The images I produce are copied reproductions that describe an actual herbarium sheet. Although the paintings appear to be "true" reflections of reality, they are actually edited and manipulated to suit my artistic intentions. The work is a representation of the "complex interactions between seeing and interpreting, an elaborate process of translating and transforming personal vision into signs and objects that are understood differently by different

communities" (Arnold 2001: 19). I leave out parts that clutter the image or that I find unappealing. I cut and paste other elements together and change the composition. So while the images appear to reflect something "real", this is clearly a deceit, and herein lies the transformative magic of the image. The images and text proposed alternative ways of viewing "nature".

My intentions are echoed by Colin Richards where he writes about the exhibition *Graft* that he curated for the *2nd Johannesburg Biennale*: "Before contact, a 'graft' involves cutting. The cut is not simply a boundary, an edge or two, but a deep, even traumatic incision, an inscription. In cutting into and across 'difference', 'graft' enjoins the 'hybridity' without disavowing the violence and the desire which underpins cultural fusion. 'Graft' makes tensions between metaphors of nature and culture, and the way cultural discourse (dis)articulates these tensions" (Richards 1997: 234).

Curiositii reminds us what has been lost and can never be regained – the stories, traditions and knowledge surrounding the plants of South Africa – and it takes on a slightly sentimental note. This is intentional and echoes Baudrillard's comment: "When the real is no longer what it used to be, nostalgia assumes its full meaning. There is a proliferation of myths of origin and signs of reality; of second-hand truth, objectivity and authenticity. There is an escalation of the true, of the lived experience; a resurrection of the figurative where the object and substance have disappeared" (1998: 169).

Conclusion

The eighteenth–century practices of "scientific" collection, annotation and display bear the traces of their history derived from curiosity collecting. They are part of the scholarship committed to the idea that knowledge was "discovered". Postmodern critique questions this notion and argues that knowledge is produced and tends to "naturalise" certain concepts to disguise the political will underpinning them (Shepard 2002: 127). Curiosity collections signified intelligence, wealth and reflected the social status of the owner who were colonial in their political and social affiliations. The collections were considered to be knowledge itself and this demonstrates the sociological climate that produced these assumptions.

Botanical art is stigmatised as being an inferior art form and occupies a rather strange and under-acknowledged place within visual art. This hybrid art challenges the artificial boundaries between art and science, yet few artists, academics or scientists have challenged the conception of botanical art. This needs to be re-evaluated.

The illusionistic nature of botanical art allows the viewer to suspend disbelief, facilitating the replacement of the image with "nature". Botanical art thus exists within a strong web of reason where "texts" assume authority over "nature". My work is aimed at exposing this paradigm and questions the hierarchical structures that impose those beliefs. Text and image are combined to

re-establish broken links caused by scientific episteme that dictates that indigenous knowledge is excluded from scientific knowledge.

The act of describing any object accurately and without bias is a contradiction in terms. The person observing something is expressing a personal opinion of what the object is or represents. The most convincing images within the genre manage to bridge the divide between art and science without drawing attention to their crafting. They are compelling because they simulate the presence of "natural" life forces using the simple medium of watercolour. My work aims to uncover the deceit implied by the accepted episteme of botanical art in which the role of the artist is underplayed. I emphasise, through the manipulation of the image, the requirements of the artist for the image to meet artistic needs, and herein lies the image's transformative magic. In my practical work I cobble many elements together into a mythical tapestry. *Curiositii* challenges the web of scientific reason and encourages the viewer to question the production of "grand narratives".

Conclusion

The botanical and travel journals, specimen collections, experiments and publications of scientific papers and theories produced within the botanical field in the seventeenth and eighteenth centuries initiated a body of knowledge that became accepted as embodying knowledge and "truth". Some remnants of these naturalised" concepts embedded in the imperialist era are still expressed in contemporary botanical practices, such as the collecting of field specimens for study and the dislocation of the ethno-botanical information associated with a plant. When the seventeenth– and eighteenth–century plant hunters went "exploring" they were usually commissioned to collect specimens. There was a mad rush in the seventeenth century to "discover" and name as many plants as possible. The mapping, naming and pictorial representation of the "new worlds" was part of a process to give form to what Europeans considered a formless, empty world. They imprinted their own way of seeing on the information that was brought back from the "new worlds" and in so doing began a culture of "othering" these worlds, their inhabitants and their natural heritage.

The impact that the voyages of discovery had on European consciousness was profound, but it was regulated and controlled through the publication and reading of travel accounts, or as Pratt puts it, "survival literature". These accounts embody racist and sexist attitudes by not including African perspectives or women. Their opinions and knowledge were purposefully eliminated because they were regarded as being "inferior". The contribution of the "new world" to science was silenced by colonial ideologies. Europeans used the "new worlds" as a metaphoric playground to advance, test and prove the validity of their theories. Towards the end of the eighteenth century natural philosophy had set the corner stones for their self-legitimating discourse. Indigenous "savage" knowledge systems were ignored, suppressed and ridiculed. Europeans claimed and dominated, through their naming systems, every geographic feature, every plant and every group of people. Indigenous knowledge fell away and was replaced with "scientific" accounts that embodied imperialist ambitions.

Abstract "universal" language schemes of the eighteenth century embodied the desire to discover God's divine plan and European's hegemonic view of "nature". By inventing ways of systematising "nature", scientists believed they would be brought closer to the mind of God. "Wherever we turn in the seventeenth [and early eighteenth century], we see evidence of a desire, need and will to establish the fundamental order of God's creation and of the world *politick"* (Slaughter 1984: 7). Linnaeus focused on the abstract morphology and anatomy of plants to create his artificial system based on a linguistic code. His "rules" for classifying and naming plants ignored the cultural and geographic connections of those plants. Binominal nomenclature removed the indigenous cultural associations of a plant allowing it to inherit a new Europeanised identity. Botanical art deepened the process of abstracting "nature" to suit this particular ideology. This imperialist agenda is finally expressed in a Latin name, which at best describes some feature of the plant, but more often commemorates the individual who "discovered" the plant. The depiction, collection and renaming of plants thus gave voice to

certain social actors (the botanists whose names are commemorated in the names of many plants) and silenced others (the indigenous people associated with the plant). Botanists today have disproved most of Linnaeus's systems of classification.

"Linnaeus deliberately revived Latin for his nomenclature precisely because it was nobody's national language" (Pratt 1992: 25). Latin also had the advantage of being a very precise language. However, the choice of Latin and the rules controlling the naming of plants deliberately excluded local names and this wrote indigenous knowledge out of "scientific" nomenclatures. Stafleu outlines opposing forces (Latin versus vernacular) in the choice of Latin as the preferred language of botany: "The use of Latin had the overtone – rightly or wrongly – of the exclusive; the vernacular met the requirement of the era for the easy diffusion of knowledge" (Stafleu 1971: 209). Linnaeus's "sexual system" presented in *Systema naturae* (1735), highlighted the issue of sexual difference – a preoccupation of the era.

Botanical Latin is still used "to serve as an international medium for the scientific naming of plants in all their vast numbers and manifold diversity" (Stearn 1966: 6–7). It may indeed have been intentionally chosen by Linnaeus to exclude minority groups such as women, the poor and the uneducated as suggested by Stearn (Stearn 1966: 7).

His religious convictions and his ideas about sexuality informed his botanical ideas and also limited his understanding. Sociological factors that dictated that indigenous people and all women were inferior to European men had long-term effects on the development of science. Marginalised groups that have been excluded from the production of knowledge for hundreds of years has limited our understanding in many areas. The knowledge that has been lost through prejudice and a sense of entitlement by European colonists is immeasurable, yet many scientists still assert that the empirical checks and balances, that have their roots in the Enlightenment, keep their discipline free from these influences. While ethno-botany has begun to address some of the imbalances caused by subjugation, there is still much more work that needs to be done to address these imbalances. More self-awareness and interrogation from within would, I believe, enrich and spur taxonomy to encompass more representative, multi-dimensional perspectives. This thesis suggests that there be a more engaged awareness of the historical prejudice implied by this language and more importantly that when a new species is described, that acknowledgement be given to the indigenous knowledge that forms part of our national heritage. Let what Linnaeus banned as "barbarous" be reintroduced to binominal nomenclature. Taxonomy and art are human productions, and they cannot be quantified and validated by fields of computer-generated data until the inherent fallibility of these disciplines is acknowledged and addressed. Science claims to interrogate itself from within, but is it asking the correct questions?

The visual records that enabled natural philosophers to understand and quantify "nature" were crucial in determining the role of botanical art as a tool for scientific investigation. They contributed towards botanical illustration as it is practiced today. Sketches of plants often provided the only, albeit removed and codified, link to "nature" that the natural philosophers considered essential to their studies of "nature". An analysis of copies of field sketches was made

in Chapter 3 and showed that there are many questions as to the reliability of the senses for perceiving the world. The discussion determined the weaknesses and changes made to an image as it was re-interpreted. The sketches were produced through a set of practices that defined the discipline of botany in the seventeenth and eighteenth centuries. The role of artists employed by botanists was underplayed and they produced work that validated the ideas of botanists. These representations of plants abstracted and objectified the living and changing plant into a codified system. The features that give a plant its particular form were lost in the interpretation and provide evidence of a particular way of seeing "nature", one that did not mirror it in an unprejudiced manner.

I assert that the role of the artist was intentionally underplayed to circumscribe the fact that unavoidable human foibles accompany any visual interpretation. Ignoring the artist's role made it seem as if the images magically appeared as faithful transcriptions of "nature". It formed a vital link in the suspension of disbelief that enabled the image to gain scientific credibility. The "real" is no more rational, as Baudrillard says: "since it is no longer measured against some ideal or negative instance. It is nothing more than operational" (1988: 167). This marks the general tendency in the natural sciences to attempt to erase human error from scientific investigations. However, when the perceptions of an artist are engaged, individual interpretation cannot be avoided. The use of botanical illustration as a means of representing the "truth" is highly questionable and compromises attempts at episteme.

In line with Eurocentric conceptions about "nature", botanical art represents a plant in a way that its botanical peculiarities are emphasised and becomes a codified diagram and not a specific plant portrait. Illustrations of the seventeenth and eighteenth centuries have been shown to be highly subjective, schematic representations of the "truth". The production of these images was controlled and regulated by the natural philosophers that devised "universal" language schemes. These schemes were the power base from which knowledge was controlled, regulated and carefully disseminated to an elite audience. The image hence served the botanist and the role of the artist was suppressed. It is important for the evolution of natural history to acknowledge and recognise the historical and ideological factors that produced botanical knowledge. Raising awareness about how the sciences refelect social and political agendas, will renew current contexts for and relevance of the production of botanical art. It will also allow racism to be removed from current botanical practice.

Collecting in all its various forms systematised "nature" in a manner that carried accumulation to a totalised extremity. The popular seventeenth– and eighteenth–century curiosity collections signified the status of the owner, who was presumed to be of high intelligence because he or she owned a collection. The obsession with collecting was an extension of industrial capitalism. Specimens from the "new worlds" were ordered, arranged and redeployed into a sanitised, hegemonic, Eurocentric perspective.

My own process of making art centres on my personal interests in the ethnographic associations of the plant, evoking the history of curiosity collecting that influenced herbarium practices.

These spark off my creative process and by manipulating the image in a way that is not overtly apparent in the final artwork, I emphasise the artistic requirements I have of the image to feed my artistic needs. By presenting information derived from multiple sources in conjunction with a copied herbarium specimen (which symbolises "nature" that has been objectified by colonialist agendas), I raise questions in the viewer's mind about the lost links between taxonomy and indigenous wisdom. The craft of making the image represents a process whereby the artist and scientist attempt, as Bacon stated, to "grasp nature". This is the point at which living plants are transformed into textual codes.

I use the tradition of art-making associated with science to explore questions about the episteme, authorship, interpretation and the hidden agendas behind the production of these textual codes. The art is defined through its relationship to "reality" but takes on its own form thereof. The artists impose their own interpretation and this challenges and sometimes fools our perceptions into "believing" in the image. Baudrillard reminded us of conscientising the political and social will behind the production of images because of their relation to the problems of visual representation. I intend this interrogation to include a consciousness that acknowledges the interpretive acts of the artist. I do not intend to simply show that these images are "unscientific" but rather accentuate the role of the artist in constructing the image. The artist is the vehicle through which the information is mediated. The interpreted image becomes the object of scientific scrutiny and because this construct has become "naturalised" it disguises the agendas that underpin the work. Botanical art thus exists within a strong web of reason that imposes particular beliefs onto "texts" that eventually assume authority over "nature". In my work I aim to conscientise the impact of these Eurocentric views by including African perspectives. The final product is generated from a personal vision, encoded with certain beliefs that will have different meaning depending on who is perceiving the image.

In fine art circles, botanical art still suffers under the negative stigma associated with "illustration as there is distaste for images that serve a practical purpose" (Arnold 2001: 148). Few artists, academics or scientists have challenged the misconceptions surrounding botanical art. The often ungrounded clichés associated with perceptions about botanical art have, to my mind, stifled and limited the evolution of the genre. My thesis and practical work set out to address this gap in postmodern critique. I challenge the inherent bias towards botanical art held by the artistic community and suggest that these attitudes need to be re-assessed so that artists operating within this field can enjoy the recognition of the artistic and scientific communities within which they function.

The evolution of botanical enquiry presents all kinds of new challenges to botanical artists. As botanical research becomes increasingly reliant on mathematical, DNA-based investigations, the role of the artist in interpreting and clarifying images and the scientific concepts embedded therein could potentially transform the relationship between artists and botanists and the art from as a whole. Artists operating in this field need to re-evaluate their relationship with the science they "serve" and challenge some prevailing assumptions about the negative stigma associated with the art form to enable the transformation of outmoded, prejudiced ways of seeing and

interpreting. We are still feeling the effects of the seventeenth– and eighteenth–century imperialism and the way that botanical artists were condemned as inferior – a small cog on the "noble" process of regarding and classifying plants for the "hard" sciences.

Appendix A:
Terms and arguments used in this thesis

Texts

I employ a poststructural perspective when I consider the botanical images as "texts" that function within what I consider to be the wider Modernist discourse of natural philosophy.

Modernism

In this thesis, I understand Modernism to be one of the many discourses functioning within modernity. I argue that the Modernist discourse of science excluded South African indigenous peoples' knowledge and names for plants. The author of *The dictionary of critical theory* offers these outlines for the definition of the term:

> Modernism is in fact a surprisingly elusive term, not least in that there are so many national variations in its meaning... This literary introversion represents a rejection of most forms of nineteenth–century realism, but also a withdrawal from the public sphere... Self-referentiality or reflexivity can be accompanied by a note of high aesthetic or moral seriousness (hence the common complaint that modernism is 'difficult'), as well as a certain hostility towards the emerging mass culture of an increasingly industrialised society (Macey 2001: Sv. "modernism").

The roots of Modernist thinking can be traced back to the Renaissance (which was preempted by the Enlightenment), the first period in history to have the self-awareness to give itself a label (Jansen 1977: 366). The thousand years that followed the "barbarian" invasions were considered an age of darkness by Renaissance thinkers. A critical attitude to the "ancient texts" was adopted in the Renaissance and furthered in the Enlightenment when their shortcomings, based on their own observations, were identified. The era was literally called the "rebirth" – the word Renaissance is derived from Latin *rinassci*, to be reborn (Jansen 1977: 366). In her thesis *Writing white on black: Modernism as discursive paradigm in South African art writing on modern black art* (2006) Lize Van Robbroeck identifies the significance of the Renaissance as the start of a way of thinking that created the "othering" of nations of the "new worlds":

> For the purposes of this thesis, therefore, modernity 'began' with the Renaissance voyages of exploration (where it was formulated in a dialectical process of interaction between 'the West and the rest'), emerged as a distinct discursive paradigm during the Enlightenment, and reached a peak during the colonial excesses of the late 19th and early 20th centuries. The current academic corpus of modernity critique is predominantly aimed at the totalising discursive trend that emerged during the Enlightenment and which set the tone for the arrogant extremes of the modernist/colonialist paradigm during the late 19th and early 20th centuries...
>
> Descartes (in the humanities) and Newton (in the sciences) were particularly instrumental in the formulation of some of modernity's most enduring grand narratives, such as the liberation of humankind through rational inquiry and science as domain of truth (Van Robbroeck 2005: 34).

Humanism

Humanism, to the Italian poet Francesco Petrarca or Petrarch (c.1330) was the pursuit of learning in languages, literature, history and philosophy for its own end, in a secular rather than religious framework (Jansen 1977: 366). The move from study that was religiously-centred to one that was secular was an important feature of Renaissance thinking. "Philosophy, influenced by the new, empirical and systematic sciences of nature, was finally liberated from the confines of theology and became a field of 'pure' inquiry into matters of universal and timeless importance" (Van Robbroeck 2006: 34).

"Tribes" and tribulations

The problem of terminology always presents itself when conducting a study involving South African people because there are so many complex groups that occupied the country at different times in our history. Issues surrounding the correct, accurate and culturally appropriate way to name groups of people remain largely unresolved or are at best in a state of flux. It is quite difficult to determine *whom* the people were that the journal writers refer to as "*Hottentots*" or "*Caffres*" or "bushmen / *boessiesmans* / *boschmans*". Most of the accounts I have read only use the term "*Hottentot*", I take that to mean *Khoikhoi* and not the "*San*" or "Bushmen".[32] They were the most likely people to have been encountered by the Dutch, who were foremost interested in bartering with them for cattle. The *San* were hunter-gatherers and did not own livestock, making contact with them a less appealing option for the Dutch (Oakes 1995: 22). Historian Richard Elphick has studied the issue of who exactly the "*Hottentots*" were that the writers of the journals that I refer to were:

> The Cape *Khoikhoi* can in turn be arbitrarily divided into three subgroups of tribes: the Eastern Cape *Khoikhoi* (consisting of *Gonaqua*, *Damasqua*, and several other peoples); the Central Cape *Khoikhoi* (most notably the *Inqua*, *Attaqua*, and *Gouris*); and the Western Cape *Khoikhoi*, who resided within a hundred miles of the Cape of Good Hope. The tribes of this last group accounted for the majority of Cape *Khoikhoi* in the seventeenth century, and it is to them that almost all contemporary documents on Khoikhoi refer (Elphick 1985: xviii).

"*Khoekhoen*" is a term used by Nama-speaking people and is sometimes used to name "*Hottentots*". (Bank, Malherbe & Van der Spruy). In my thesis I concur with Elphick's definition of *Khoikhoi*: "to be any person accepted as a full (i.e. not a subordinate) member of a *Khoikhoi* community. A *Khoikhoi* community was one where a dialect of the *Khoikhoi* language was spoken where pastoralism was the preferred mode of economic life" (Elphick 1985: xxi). He considers the term an appropriate ethnic name because the group shared common origins,

[32] "[T]he 'San', who were extremely heterogeneous linguistically, culturally, and economically. The economic term 'hunter' has a further advantage over the quasi-ethnic name 'San' in that it allows for possible overlap with Khoikhoi, who, it must be remembered, were people who preferred pastoralism but could not always practice it. Thus the terminology allows for Khoikhoi-speaking hunters should the documents point to their existence. Heretofore most scholars have relied on mutually exclusive definitions of 'San' and 'Khoikhoi' and have hence failed to perceive the complex movements which took place between the two groups' (Elphick 1985: xxii)

common language (divided into dialects), common culture, and common economic aspirations (Elphick 1985: xxii).

The term *Khoikhoi* is over-generalised and offers little insight as to which group of people was being referred to, however this thesis does not allow the scope needed to give the matter the time it requires. The use of the term "Hottentot" emphasises the lack of understanding the colonists had about subtle distinctions between the various groups within the *Khoikhoi* and *San* peoples. I think that all the currently accepted names will be challenged according to the reigning discourse as informed by the current political power structures. . I am sensitive to the debates around the issue of naming indigenous groups and I take my cue on how to deal with it sensitively from a paper published by the Africa Policy Information Centre in Washington:

> Yet today most scholars who study African states and societies – both African and non-African – agree that the idea of tribe promotes misleading stereotypes. The term 'tribe' has no consistent meaning. It carries misleading historical and cultural assumptions. It blocks accurate views of African realities. At best, any interpretation of African events that relies on the idea of tribe contributes no understanding of specific issues in specific countries. At worst, it perpetuates the idea that African identities and conflicts are in some way more 'primitive' than those in other parts of the world. Such misunderstanding may lead to disastrously inappropriate policies (Africa Policy Information Centre 1997: www.africaaction.org/bp/ethall.htm).

While the term "indigenous" is unsatisfactory in many ways because it is unspecific and historically questionable (many people that were in South Africa at the time of Dutch colonisation were also immigrants from the north of Africa). I will use the term indigenous people in an attempt to avoid cultural stereotyping, unless a quoted source uses another name or I have a clear indication of the name of the group being referred to.

Scientist's criticism of postmodern critique of the sciences: The Sokal and Bricmont debate

There has been some radical reaction by theoretical physicist Alain Sokal[33] and professor of theoretical physics Jean Bricmont, among others, towards the ideas postulated by postmodern philosophers. The objections raised are numerous and the one that concerns me is the objection to seeing scientific theory as a socially constructed "text". Sokal and Bricmont outline their argument against the use of this term:

> The second problem comes from the privilege granted to theories over experiments (which is related to the privilege granted to texts over facts). The link between a scientific theory and its experimental test is often extremely complex and indirect. Therefore, a philosopher will tend to approach the sciences preferentially through their conceptual aspect (so do we, in fact). But the whole problem comes precisely from the fact that, if

[33] Alan Sokal successfully submitted an essay entitled *Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity,* to the respected postmodern journal *Social Text.* After its publication the author revealed the article to be a parody of much cultural studies commentary on science. "It was riddled with non-sequiturs and unscientific nonsense, but was also with quotations from, and references to, the patron saints of post-modernity and, no doubt in part as a result of those references, it was published in its entirety. The quotations were, in Sokal's words, "absurd or devoid of meaning" (Underwood 2003: www.physics.nyu.edu/faculty/sokal/lovejoy.html).

> one does not also take into account the empirical aspects, then scientific discourse indeed becomes nothing more than a 'myth' or 'narration' among many others (Sokal & Bricmont 1998: 185/6).

Sokal and Bricmont provide a convincing argument against this notion; they believe in the controls and testing that the hard sciences use and say that these tests offer more precise, quantifiable results and uncover unknown phenomena than "everyday observations" and applying "common sense" do. They believe that scientific theories explain "our experience [and] refers to all our observations; including the results of laboratory experiments whose goal is to test quantitatively the predictions of scientific theories" logically and consistently (Sokal & Bricmont 1998: 54). Sokal and Bricmont reject postmodern philosophical criticism of the sciences:

> For most of the past two centuries, the left has been identified with science and against obscurantism, believing that rational thought and the fearless analysis of objective reality (both natural and social) are incisive tools for combating the mystifications promoted by the powerful – not to mention being desirable human ends in their own right. And yet, over the past two decades, a large number of 'progressive' or 'leftist' academic humanists and social scientists (though virtually no natural scientists, whatever their political views) have turned away from this Enlightenment legacy and – bolstered by French imports such as deconstruction as well as by homegrown doctrines like feminist standpoint on epistemology – have embraced one or another version of epistemic relativism (Sokal 1998: 187).

They reject the premise of some postmodern criticism, which uses social theory and applies it to critiques of scientific practices; here they outline their argument:

> First of all, the author or the literality of the text has, in literature even in philosophy, a relevance they do not have in science. One can learn physics without ever reading Galileo, Newton or Einstein, and study biology without reading a line of Darwin. What matters are the factual and theoretical arguments these authors offer, not the words they used. Besides, their ideas may have been radically modified or even overturned by subsequent developments in their disciplines. Furthermore scientists' personal qualities and extra-scientific beliefs are irrelevant to the evaluation of their theories. Newton's mysticism and alchemy for example, are important for the history of science and more generally for the history of human thought, but not for physics (Sokal & Bricmont 1998: 185/6).

Postmodern defendant Bruce Robbins provides a different perspective on Sokal's opinions about inter-disciplinary jurisdiction:

> Since the decline of philosophy's claim that it could act as a master discipline, legislating for other disciplines, how are we to adjudicate these questions of jurisdiction? It is certainly not enough to treat any and all fields with exaggerated respect as if they were off limits, to intruders or ends rather than means. No solution in which each discipline or method is asked to retreat into its own distinctive domain is going to work, since domains are not and cannot be absolutely distinct.

The oscillation between defensive withdrawal and imperial aggression in Sokal and Bricmont is difficult to assimilate. Perhaps the only difference between their imperialism and "ours" is that our version is ready to concede that there is no simple way to adjudicate between the competing imperial claims (Robbins 1997: www.radicalphilosophy.com/default.asp?channel_id=2187& editorial_id=10289).

Defining episteme

> Science without epistemology is – insofar as it is thinkable at all – primitive and muddled. However, no sooner has the epistemologist, who is seeking a clear system, fought his way through such a system, than he is inclined to interpret the thought-content of science in the sense of his system and to reject whatever does not fit into his system. The scientist, however, cannot afford to carry his striving for epistemological systematic that far (Einstein 1949: 684).

My argument in this thesis revolves around the concepts we attach to the term episteme. It is therefore necessary to outline some of the differing ways that the term has been interpreted. *The dictionary of critical theory* (2001) gives a comprehensive description of the postmodern interpretation of epistemology (a word derived from the Greek word for knowledge), and its significance to critical theory:

> That branch of philosophy which deals with the theory, nature, scope and basis of knowledge, or which investigates the possibility of knowledge itself. The French philosophical tradition makes a distinction between 'theory of knowledge' and 'epistemology', and defines the latter as the critical study of the principles, hypotheses and findings of the various sciences. Defined in that sense, epistemology seeks to determine the logical origins, value and objective import of the sciences.
>
> ...Epistemology has traditionally been seen as sitting in judgment on other areas of philosophy or functioning as a court of appeal which rules on what can and cannot be known... Feminist epistemology can take the form of the critiques of phallocentrism and phallogocentrism put forward by Cixous, Kristeva or Irigray, who attempt to map a specifically feminine imaginary and a new sexual economy that can speak of and to women's needs and desires. It can also take the form of an attempt to gender knowledge by challenging the supposed objectivity and value-neutrality of knowledge, and especially science, and demonstrating that knowledge is always socially constructed, and therefore influenced by the social construction of gender (Harding 1976; Lennon and Whitford 1994). Such gender critiques have been particularly significant in the social, biological and medical sciences, and often take as one of their starting points Foucault's thesis that any form of epistemology is also a regime of power (Macey 2002: 113 – 115).

The word episteme is hence employed by Foucault to describe the historical set of relations uniting the various discursive practices and formations that are generated by the sciences and other forms of knowledge. In this thesis Foucault's interpretation of episteme is accepted as being "a structure defining the conditions that both make knowledge possible and restrict its scope" (Macey 2001: 114). Foucault's thesis on epistemology *The order of things* (1970) provides a definitive account of the relationship between taxonomies and epistemology. Here he outlines the focus of the essay:

> I am concerned here with observing how a culture experiences the propinquity of things, how it establishes the *tabula* of their relationships and the order by which they must be considered. I am concerned, in short, with a history of resemblance: on what conditions was Classical thought able to reflect relations of similarity or equivalence between things, relations that would provide a foundation and a justification for their words, their classifications, their systems of exchange? (Foucault 1070: xxiv).

Foucault argues that it is impossible for a reader to step out of a discourse and see things objectively because our understanding is governed by these discourses. "In *The order of things* (1970) Foucault wanted to show that there were rules of formation common to the apparently unrelated sciences of natural history, economics, and grammar, as well as that these rules of formation, sometimes called *episteme* of the classical period, were totally unlike what preceded and came after them" (Davidson 1986: 222).

As scientific philosophy evolved, "texts" collectively acquired meaning. A refined and elaborate system of checks and balances has gradually been established in scientific methodology.[34] This is intended to help the scientist remain unbiased in his/her interpretation of the data being subjected to analysis. Technological advancements made in scientific instrumentation have enabled experimentation to become a finely tuned, measured and regulated process, one aimed at improving the standards of empiricism. Sokal and Bricmont have this to say about the meaning of epistemology to science:

> However, we do not claim that these principles can be codified in a definitive way, or that the list is exhaustive. In other words, there does not exist (at least at present) a complete codification of scientific rationality, and we seriously doubt that one could ever exist. After all, the future is inherently unpredictable; rationality is always an adaptation to a new situation. Nevertheless – and this is the main difference between and the radical skeptics – we think that well-developed scientific theories are in general supported by good arguments, but the rationality of those arguments must be analysed case-by-case (Sokal & Bricmont 1998: 56)

There is self-awareness present within the scientific community that encourages scientific practitioners to constantly question their work. Theories are not proved they are instead disproved. [35] Sokal and Bricmont also admit that rationality is situation dependent: "rationality is always an adaptation to a new situation" (Sokal & Bricmont 1998: 56).

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[34] "Popper's basic ideas are well known. He wants, first of all, to give a criterion for demarcating between scientific and non-scientific theories, and he thinks he has found it in the notion of falsifiability: in order to the scientific, a theory must make predictions that can, in principle, be false in the real world. For Popper, theories such as astrology or psychoanalysis avoid subjecting themselves to such a test, either by not making precise predictions or by arranging their statements in an ad hoc fashion in order to accommodate empirical results whenever they contradict the theory.

If a theory is falsifiable, hence scientific, it may be subjected to attempts at falsification. That is, one may compare the theory's empirical predictions with observations or experiments; and if the latter contradict the predictions, it follows that the theory is false and must be rejected" (Sokal & Bricmont 1998: 59).

[35] "This emphasis on falsification (as opposed to verification) underlines, according to Popper, a crucial asymmetry: one can never prove that a theory is true, because it makes, in general, an infinite number of empirical predictions, of which only a finite subset can ever be tested; but one can nevertheless prove that a theory is false, because, to do that, a single (reliable) observation contradicting the theory suffices" (Sokal & Bricmont 1998: 59).

I do not wish to put words in their mouths, but the ideas presented by these two scientists are actually quite postmodern, according to my understanding of postmodernism, which challenges the reigning discourse and acknowledges the restrictions imposed on our understanding due to social and historical factors. In essence this concurs with what Sokal and Bricmont are saying about scientific episteme.

Appendix B:
Description of the manuscripts used for this study and a history of their ownership

Florilegia (collection of paintings of flowers)

There are several florilegia of original paintings made of South African plants that I have consulted for the purposes of my study. Here a follows a brief description and history of the separate volumes.

There are several florilegia that exist in collections in South Africa that are thought to be possible pieces of the so-called *Codex Witsenii.* The collection of drawings (an estimated 1500 paintings) in three volumes assembled by Nicolaas Witsen, a director of the Dutch East India Company, came into the hands of Caspar Commelin and was used to publish references in *Praeludia Botanica* (1703) (Stafleu: 1977: 165). After his death the drawings the collection passed onto his successor at the botany department at the Amsterdam Athenaeum, Johannes Burman. Burman used some of the drawings as the basis for his engravings for *Rarioum Africanum plantrum decades* (1738–39) (Gunn & Codd 1981: 39).

***Codex Witsenii* (1692) in the South African Museum, Cape Town.**

DESCRIPTION: The front cover has a large capital "Q." in faded ink. There are indications that two letters have been erased from the middle of the cover. The back cover has 9 gilt-ornamented panels. The cover is the same colour as the NBI codex inscribed by Burman. It comprises 78 folios (59 of which are botanical). The codex has been known as the Witsen codex because of the inscription inside it by Witsen, however it could be one of the three volumes commissioned by him. The inscription in the Codex states: "*Dit werk is voor mij aan de Kaap gemackt. N: Witsen. 1692".* Gunn and Codd describe the work as being of "Claudius type" (1981: 40). The work however does not have the same finesse and sensitivity to colouration as the National Library collection.

HISTORY: Edwards agrees that Burman used a few as the basis of engravings in *Rariorum Africanarum plantrum decades* (1738–39). I, however, think that it is more likely that he used the copies in the NBI (Mary Gunn library) in Pretoria a set also owned by Burman. According to Edwards, Seba used several of these drawings in his *Thesarus.* The volume was given to the museum in 1829 by J. A. Truter (1763–1845), Chief Justice of Cape Province, it unknown how it came to be in his possession. I have based my study on the 2002 version *Codex Witsenii: Annotated watercolours of landscapes, flora and fauna observed on the expedition to the Copper Mountains in the country of the Namaqua undertaken in 1685–6 by Simon Van Der Stel, Commander at the Cape of Good Hope. Copied at the Cape in 1692 for Nicolaas Witsen, mayor of Amsterdam, member of the Amsterdam chamber of the Dutch East India Company, ambassador to Great Britain, &c, &c* (2002). This

publication is a complete life-sized full-colour reproduction of all these drawings with insightful accompanying essays.

***Fagel Ms. 984* (1685) Trinity College, Dublin.**
HISTORY: The Dutch East Indian Company made several expeditions into the hinterland from their settlement at the Cape. From the point of view of pictorial records the expedition of Simon Van der Stel's expedition to Namaqualand between 1685 and 1686 is important. The official report of this expedition disappeared from the Company's Archives in 1691 or 1662 (Edwards 1978: 335). The paintings associated with the manuscript that was discovered in Dublin has clear links with *Codex Witsenii* as it is on these drawings that the codex is in part based, the part that is represented by the collection in the South African Museum. All the plant species represented in the above codex are also in this manuscript. Waterhouse (1932) considers this to be the missing official report made by Simon Van der Stel to the Dutch East India Company (Edwards 1978: 335). Bishop Compton of London (1632–1713) was given a set of the Van der Stel expedition drawings when he visited Amsterdam in 1691.

***Claudius album/manuscript* (c.1685) National Library of South Africa, Cape Town.**
DESCRIPTION: The paintings are foolscap size and sewn with one folio per section. There is no ornamentation on the boards or spine, other than an inked number 55 (or 59) on a label, and the number 244 in the top right hand corner of the front cover. The words "*Teckeningen van gewassen an gevolgelte ann Cabo de Goede Hoop*" is in a different hand to the annotations on the sketches and was clearly intended as a binder's title for the volume (Kerkham 1992: 148). The volume is called the *Claudius album*, and as its name implies, it has been attributed to Heinrich Claudius. Some paintings of plants correspond to both of the *Codex Witsenii* and the *Fagel manuscript*. The volumes are clearly copies of one another, yet it is impossible to determine which was made first.

I have checked all three of the above volumes carefully and they contain similar drawings. Some drawings are unique to a volume and others occur in all three, I have collected all this information into a single spread sheet (see end of Appendix C). While none of the paintings are perfect copies they are similar enough to confidently claim they are copies based on one another.

***Icones Plantarum et Animalium*, Johannesburg Public Library, Johannesburg.**
DESCRIPTION: 120 Folios (3 landscapes, 61 of flora on single sheets, of which 2 are duplicates, and 36 of fauna, with 1–3 drawings per page). Gunn And Codd say the volume comprises "283 folios, all botanical" (1981: 41). The drawings are closely similar to those of *Codex Witsenii*, however they are much more finely executed. The annotations on the reverse side are almost identical to those in the *Codex Witsenii* (Wilson, Van Hove-Exalto & Wijands 1996: 21). It has been suggested that these drawings were once part of the *Codex Witsenii* but according to Edwards there is no indication of any direct connection with either Witsen or Burman (Edwards 1978: 336). However Gunn, Codd and Stafleu state that Burman inherited the entire codex from Commelin, who received it from Witsen. A considerable

number (78) of these *Icones* drawings were used for as the basis of engravings in Burman's *Decades* (Codd & Gunn 1981: 42). This album has unfortunately recently been "misplaced" according to a special collections librarian at the Johannesburg Public Library. This has impacted on my research, as I have been unable to make any comparisons from this volume.

***Afbeeldinge van enige Caapsche gewassen, dogh meest bloembollen, waarbij ik de Latijnsche naamen geschreven heb.* Johannes Burman (1755) Mary Gunn Library, South African National Biodiversity Institute, Pretoria**

DESCRIPTION: The volume is bound in off-white vellum with gilt-ornamented panels. The binding of the book is similar to the florilegium in the South African Museum collection and according to Gunn and Du Plessis they are executed on a similar paper to that in Breyne's *Flora Capensis* (Gunn & Du Plessis 1978:30). The pages are 26cm by 36.5 cm. The paintings are annotated in Johannes Burman's hand and correspond to some engravings in his *Rariorum Africanarum plantrum decades* (1738–39), indicating his ownership of the volume. It bears the description in Dutch which reads in translation: "Illustrations of some Cape plants, but particularly flowers with bulbs, next to which I have written the Latin names, Johannes Burmann, 3 August 1755" (Edwards 1978: 340).

HISTORY: Edwards speculates that the volume of drawings in the NBI set could have been part of the *Codex Witsenii* (Edwards 1978: 340). I agree this is possible because they are bound in exactly the same way as the South African Museum set. The Pretoria set were copied for Levinius Vincent (1658–1727) and bought by Boerhaave for William Sherad in 1727. They now form the *Sherad Ms 174* in the Bodleian library at Oxford. I found copies of paintings from the three above collections in this album, however most of the illustrations relate to another florilegium:

***The Flora Capensis* Jacob and Phillip Breyne (c. 1724) Brenthurst Library, Johannesburg.**

DESCRIPTION: The binding, estimated to have been made in 1724, is in full red morocco leather and tooled in gold, was commissioned by Johann Phillip Breyne and bears the family coat of arms. Gunn and Du Plessis establish through the argument of the age of the paper that this volume could be an original set painted at the Cape (Gunn & Du Plessis 1978: 30). The drawings are 310mm x 195mm. "Just below many of the paintings in this volume on the right hand side of the plant, is a number that corresponds exactly with the page numbers of the three florilegia in the NBI Library, the Bodleian Library and the Rijksherbarium in Leiden" (Gunn & Du Plessis 1978: 30). An inscription dated 1724 by Johann Philipp Breyne states that the paintings were acquired by his father, Jacob Breyne

***Sherard Ms. 174.* William Sherard Collection Bodleian Library, Oxford.**

HISTORY: Vellum bound volume almost identical to the Brenthurst volume (Gunn & Codd 1981: 45). The paintings are pasted onto sheets bound into the volume. The NBI drawings were also copied for Levinius Vincent (1658–1727) and bought by Boerhaave for William Sherard in 1727. They are now housed in the Bodleian Library in Oxford. Some drawings

are signed A.B. Del, the name of one of Breyne's daughters Anna Renata who signed her paintings A. B. Perhaps this set is by the same painter? According to Gunn and Du Plessis they are inferiorly executed copies (1978: 30).

***Rijksherbarium Collection*, Leiden.**
DESCRIPTION: Unbound drawings that appear to be "inferior copies" were acquired by David van Royen in 1778 when Albertus Seba's estate was auctioned.

***Ms. germ. Qu. 238.* (c. 1687–92) Staatsbibliotheek Preussischer Kulturbesitz, Berlin.**
DESCRIPTION: The original unpublished manuscript was written between 1687 and 1692. The 84 leaves are bound in vellum and measure 200/210 mm x 150/160 mm. The ink drawings of plant images are reproduced in black and white (it is unclear to me whether the originals are in black ink or not). All the species represented in this collection are the same as those in the Trinity College collection, except for one, and this collection does not include the 16 botanical drawings in the *Claudius Album*. This leads the authors of *Jan Commelin's monograph on Cape Flora* to the conclusion that the Trinity College manuscript was the source for this volume (Wilson & Van Hove 1996:7).
HISTORY: The compositions have been changed to include ground with the bulbs lying on top of the ground in their dissected form. They are clearly by a different artist to the *Fagel Ms.* Dr. Otto Wijnands of Wageningen Agricultural University in the Netherlands, who is considered an authority on the early Dutch botanists, has identified this work as possibly being copied by Jan Moninckxx or Stephanus Cousyns, "who probably copied the drawings sent by Bacx and Van der Stel" (Wijnands 1996: 12). This collection was therefore drawn in Amsterdam and not at the Cape. Wijnands says that Commelin left the work of publishing the plants incompleted on his death in 1692. Engravings with the same composition as this appear in Petiver's *Jacobi Petiveri Opera, historiam naturalem spectantia: containing several thousand figures of birds, beasts, fish, reptiles, insects, shells, corals, and fossils : also of trees, shrubs, herbs, fruits, fungus's, mosses, sea-weeds, &c. from all parts, adapted to Ray's History of Plants, on above three hundred copperplates, with English and Latin names* ... (1764). All the drawings are reproduced in *Jan Commelin's monograph on Cape Flora* (1996) edited by M. L. Wilson, T. T. van Hove-Exalto and D. O. Wijnands.

***Ms. Dresd. B64 – 66a* (1685–86 and 1700) Manuscripts collection, Sachsische Landesbibilotthek, Staats – and Universitatsbibiliothek, Dresden.**
DESCRIPTION: 59 Botanical drawings described in German as a collection of East Indian plants and herbs drawn from nature in Batavia for Nic(olaas) Witsen 1685–86 and 1700, and comprising four volumes with the catalogue numbers 64–66a.
HISTORY: "When the five sets of drawings are compared, it is evident that the *Codex Witsenii*, the Dresden volume and the *Icones Plantarum et Animalium* derive from a common source. However, although the other collections contain illustrations that are recognisably the same species of flora or fauna as are to be found in those just mentioned, the graphic treatment of each differs from the other to the extent that it is not possible to

determine a common source for all of them" (Wilson, Van Hove-Exalto & Wijnands 1996: 21 & 6).

***Banksian MS Nr. 88.* (c. 1690) Natural History Museum, London.**
DESCRIPTION: A smallish leather-bound volume measuring 200 x 170 mm. It contains 73 rough watercolour sketches of Cape plants copied from *Sloane manuscript 5286* (in the British Museum). Each page contains a number in Petiver's hand in the top left-hand corner that begins with the letters G.N. (*Gazophylacii naturae*). The set, owned by English botanist James Petiver, contains many engravings that appear in *Gazophylacii naturae* and which correspond to drawings in this volume. There is a hand-written inscription by Manuthus (spelling could be wrong writing difficult to make out) dated 1892 in the front of the book which in part reads:

> These are the 'original paintings' of some of the figures in the ninth decade of Petiver's *Gazophylacii* . The 100 figures in this decade are 'copied from original paintings taken from the living plants, viz, those which the State of Amsterdam presented to the Right Reverend the Bishop of London (Compton) when his Lordship was at the Congress there in A.D. 1691, with above fifty others painted from growing plants' (Petiver Decade 9 *Gazophylacii naturae*). This volume contains the latter drawings – see Petiver's observations in the letter press of this decade Tab. 187.4, he says 'I take this to be the same with the Bishop of London's paintings under Fig. 5, Pluk. Phytographia Tab. 187.4. although his Lordship's has but 3 flowers and the leaves set higher on the stalk' – see also tab 88 Figs. 1 & 2 . Contains 72 drawings (transcription from the original document).

This is the reason why this document has been considered the collection Petiver purchased from the Cape. However Edwards claims that they are: "merely poor copies of 73 drawings in the collection of drawings of Cape plants which form Sloane Manuscript 5286 in the British Museum, London (Edwards: 1968: 243).

***Sloane Manuscript 5286* (c.1691) British Museum, London.**
DESCRIPTION: The volume is entitled: "A volume of plants growing about the Cape of Good Hope which are copies of the original paintings which the State of Amsterdam presented to Dr. Compton, Bishop of London when he was at the Congress there in 1691". Edwards adds that the copies of the Bishop Compton's drawings are not included in this volume ((1968: 244). The volume comprises 92 folios all except the first have one drawing. On the first sheet are two mounted sheets with seven drawings. All but eight of these drawings bear a reference to the *Gazophylacium* Tab., Fig. and catalogue number and also have as a heading the Latin name of the plant (Edwards 246: 1968).

***Collection of watercolour drawings from the Cape, possibly by Voet, Burman, Claudius, Oldenland* (c. 1685). Drawings CUP'D 58. Botany Library, Natural History Museum, London.**
DESCRIPTION: There is very little information about this large volume of 113 unmounted watercolours by various artists. Each drawing contains a depiction of a South African plant and is clearly not the work of a single artist. The pages are roughly A3 in size and the

volume is unbound. Some of the pages contain hand-written annotations about the plant on the back.

Collection of drawings by Francis Masson. **Natural History Museum, London.**
DESCRIPTION: The leather bound portfolio of drawings is described in the catalogue as: *141 sheets of water-colour drawings of plants from South Africa, Canaries, Azores, West Indies...etc. and 2 views of Niagara.* The volume contains a Ms. index at the rear.

François leVaillant, traveller in South Africa, and his collection of 165 watercolour paintings. **Library of Parliament, Cape Town.**
DESCRIPTION: Contains 47 high standard images of plants. The watercolours are enclosed within yellow borders outlined in black while others are mounted on sheets measuring 525 x 337mm. The average size of the paintings is 305 x 240mm. Dr M. Bokhorst maintains that two distinct hands were responsible for the paintings, but says that 23 were probably the work of LeVaillant himself (Gunn & Codd 1973: xvii). "The botanical paintings are of a high standard artistically, though occasional inaccuracies have crept in, e.g. the leaves of *Acacia erioloba* (Plate 123) being shown to be pinnate instead of bipinnate" (Gunn & Codd 1981: 225).
HISTORY: These paintings were auctioned in 1963 by Sotherby's in London. There is a comprehensive description of the history of these drawings in Mattthys Bokhorst's essay *The origin and history of the LeVaillant collection of watercolours* (Gunn & De Villiers 1973: 85–96).

Gordon Atlas. **Rijksprentenkabinet, Rijks Museum, Amsterdam.**
DESCRIPTION: A collection of 387 very clear original coloured drawings of Quadrupels... mounted and bound, in 4 volumes half red morocco (excluding the maps and landscape drawings). In 1914 six volumes (the entire set) was auctioned and bought by Martinius Nijhof. Subsequently the Dutch government took over the purchase and presented it to the Rijks Museum where it resides today. In 1964 his journals and papers were discovered in Staffordshire, England (Cullinan 1992:15). Although Gordon's wife claimed that they were all "designed by her own husband, who drew every outline, and had them finished under his own eye" (Cullinan 1992: 11), many of the original drawings must have been made by Johannes Schumacher the artist who accompanied him and was employed solely for the purpose of visually documenting his journeys.

In the Amsterdam Botanic Gardens there are many superb drawings by Jan and Maria Moninckxx recording plants (including South African plants) that were growing in the garden in the seventeenth century.

Copies of florilegia

Phyllis Edwards has written two papers that give a comprehensive account of the movement, acquisition and use in publications of field sketches papers on the correlation between some

drawings and published material. They are: *The taxonomic importance of the original drawings of published illustrations, with special reference to those of the 17th and 18th centuries relating to the flora of the Cape of Good Hope* (Edwards 1978: 335–341). The second paper *Sloane Manuscript 5286, an important source for Decade 9, Herbarium Capense* of Petiver's *Gazophylacium naturae et artis* (Edwards 1968: 243–253).

She specifically establishes the relationship between James Petiver's *Gazophylacium Naturae and Artis, Decade 9* in *Herbarium Capense* and its source paintings which she claims are contained in *Sloane manuscript 5286* (Edwards 1968: 243). There are many paintings contained in M.S. No. 88 that also correspond to the same decade. I have not seen Sloane Manuscript 5286 and am therefore unable to argue against Edward's findings. *Codex Witsenii* (2002) has cross-referenced all the known copies of plant images from the period and the publications they relate to, and I have used some of the information contained within to compile the spread sheet on the overleaf. The other information has been gleaned from other papers: *A description of the Codex Witsenii in the South African Museum* (Barnard 1947: 1–51) for the information regarding the now missing codex of drawings in the Johannesburg Public Library. The intention is to compile as much known information about the copied drawings in one place.

I have been able to personally confirm that the drawings contained in *Claudius Album* in the National Library of South Africa, Cape Town; *Codex Witsenii* in the South African Museum, Cape Town; and *Fagel Ms. 984* in Trinity College, Dublin[36] are copies of one another by making a close comparison of all the correlating drawings. While these drawings do differ in certain ways, they are definitely facsimiles of one another. The table at the end of the Appendix C establishes the correlations between the paintings contained in these three collections. The information about the other manuscripts is based on previously published material, I have not been personally able to confirm that the paintings correspond to each other visually, and rely on the authors of the papers mentioned.

The *Claudius Album* and the *Fagel Ms.* are stylistically the most similar. The *Fagel Ms.* has been attributed to Claudius and if this is true then I would venture to say that the *Claudius Album* is also by him. I do not think that Claudius did the copy commissioned by Nicolaas Witsen that is in the South African Museum. The inconsistency between the styles of the two volumes is marked, indicating that the paintings were made by different artists, whereas the other two florilegia are stylistically much more unified. The *Codex Wisenii* artwork appears to be a copy by a less skilled artist – the quality of colour interpretation and attention to form is much more generalised and insensitive than in the other two collections.

Something that I did notice when making my comparison between the *Claudius Album* and the *Fagel Ms.* besides the consistency of style, was that there often seemed to be a mirrored part of the image. Perhaps the copied images were "traced" using the back of the paper, or perhaps

[36] I used the photographed colour copy for the *Claudius Album* in the National Library of South Africa, for or *Codex Witsenii* I used the 2002 publication, for *Fagel Ms. 984,* I used the 1932 edition by Waterhouse which is unfortunately in black and white.

the changes were intentional to make each set of drawings unique. The similarities between all three are very striking in general. The differences occur in the accuracy of describing the proportions between elements of the plant; the number of leaves and flowers depicted although the composition and arrangement of the stems is fairly consistent. It is as though tracing to maintain accuracy between copies was not a favoured technique.

CORRELATIONS BETWEEN PAINTINGS OF SOUTH AFRICAN FLORA IN 7 NATIONAL AND INTERNATIONAL COLLECTIONS

NAME OF FLORILEGIA	Claudius Album	Codex Witsenii	Codex Witsenii	Fagel Ms. 984	Icones plantarum...	Ms. Germ. Quart 238	Sloane Ms. 5286
COLLECTION	Nat. Lib. SA	SA Museum	Published Nrs. in Codex	Trinity College	Jnb. Pub. Library	Staats. Preussischer	British Library
	Cape Town	Cape Town	Witsenii (2002)	Dublin	Johannesburg	Kulturbezitz, Berlin	London
	Folio Number	Folio Number	Folio Number	Folio Number	Folio Number	Folio Number	Folio Number
BOTANICAL IDENTIFICATION as given in the Claudius manuscript (some names are outdated).							
Wurmbea spicata	7648	B1	58	839	IPA 319	26	
Aloe variegata	7649	B2	41	821	IPA 289	118/120	f.63
Asclepias cancelleta	7650	B3	70	841	IPA 306	100/102	f.34
Gladiolus augustus	7651	B4	possibly Babiana tubulosa 37	835	IPA 323	14?	
Nemesia bicornis	7652	B5	47	815	IPA 312	56	
Aloe melanacantha	7653	B6	7	843	IPA 288	122/124	f.62
Botanical Identification							
Euphorbia stellispina	7654	B7	82	851	IPA 302	106	f.59
Euclea Acutifolia	7655	B8	83	847	IPA 302		
Protasparagus capensis	7656	B9	77	817	IPA 316	80/82	
Heliophila coronopifolia	7657	B10	45	805	IPA 329	52	
Walleria gracilis	7658	B11	52	859	IPA 330	108	
Fockea edulis	7659	B12	78	825	IPA 317	90/92	
Acacia karroo	7660	B13	71	807	IPA 343	136	
Albuca altissima	7661	B14	Albuca maxima 55	849	IPA 320	30/32	
Pelargonium echinatum	7662	B15	81	827	IPA 295	74/76	f.36
Probably a Sarcocaulon	7663	B16	Pelargonium carnosum 76	793	IPA 348	48	
Gladiolus caryophyllaceus	7664	B17	49	801	IPA 303	22	f.79
Labeckia systisoides	7665	B18	44	803	IPA 299/IPA 301	140	
Nylandtia spinosa	7666	B19	57	865	IPA 314	146	
Montinia caryophyllacea	7667	B20	33	813	IPA 311	168	
Cotyledon orbiculata	7668	B21	39	857	IPA 292	114	f.64
Veltheimia capensis	7669	B22	80	789	IPA 307	34/36	
Aloe dichotoma	7670	B23	53	799	IPA 290	132	
Lachenalia hirta	7671	B24	48	795	IPA 321	18	
Pelargonium incrassatum	7672	B25	64	869	IPA 297	72	f.38
Pteronia onobromoides	7673	B26	72	791	IPA 346	60	
Annesorrhiza altiscapa	7675	B28	Possibly Glia prolifera 9	811	IPA 332	64	
Aloe khamiesensis	7676	B29	54	845	IPA 291	128	f.65
Heeria argentea	7677	B30	61	819	IPA 315	158	
Diospyros austro-africana	7678	B31	56	833	IPA 313	148	
Asclepias fruticosa	7679	B32	60	837	IPA 331	96/98	f.33
Gazania heteiochaeta	7680	B33	75	853	IPA341	40	
Erythrophysa alata	7681	B34	51	855	IPA 327	164	
Lapeyransia pyramidalis	7682	B35	Lapeirousia jacqinii 43	785	IPA 322	6	
Morea fugax	7683	B36	69	797	IPA 305	10?	
Unidentified legume	7684	B37	73	863	IPA 342	142	
Ficus cordata	7685	B38	68	823	IPA 344	154	
Euclea tomentosa	7686	B39	46	809	IPA 328	160	
Euphorbia loricata	7687	B40	35	861	IPA 310	112	f.16
			Cyphia digitata 74	831			
			Sceletiumsp.prob.expansum 59	787			
			Asparagus capensis 77	817			
			Gladiolus speciosus 79	829			

NOTE: ALL THE NUMBERS NEXT TO ONE ANOTHER SHOW THAT THERE ARE CLOSE COPIES IN OTHER FLOILEGIA.
The numbers in the new publicatio of the Codex Witsenii in the SA Museum have been included for ease of reference for those who may not have access to the original document.

Appendix C: Transcripts of e-mail conversations

Correspondence with Dr. E. M. Marais (Botany dept. University of Stellenbosch)

-----Original Message-----
From: Karen Stewart [mailto:karen@mediaweb.co.za]
Sent: 04 July 2006 22:54
To: Marais, EM, Dr <emm@sun.ac.za>
Subject: Pelargonium hybridisation

Hi Bettie

I remember in on of our conversations that you mentioned that Pelargoniums have been hybridised since early 1800s for commercial gain in Germany. Can you provide me with a few specifics, like the species and the name of the German company that did it. Is the company still doing it? Where can I get more info? I need it for my thesis.

Thanks
Karen

On 17 Jul 2006, at 10:03 AM, Marais, EM, Dr <emm@sun.ac.za> wrote:

Dear Karen
The company in Germany, currently functioning - I hope so! is Fischer Pelargonium. I am sure you will find it on the Internet. I visited them in Koblenz (Spelling?)in 1988. I am sure they will still be there. Fischer himself is not so young anymore, but he had 5 or 7 children. When I visited them in 1988 at least one son and a son-in-law-to-be were concerned with the nursery. In 2000 I attended a symposium where a post doct gave a paper on work in Switzerland and one of her sponsors was Fischer Pelargonium.
Hybridization in the 1800's: You should look in the books of Sweet (1800 - 1826) "Geraniaceae" I think 5 or 6 volumes. There is a set in the Bolus herbarium at UK. Books of Andrews (about the same dates) are also available at Bolus. We have the Microfisch of Sweet's books (May be also those of Andrews)
Bettie

-----Original Message-----
From: Karen Stewart [mailto:karen@mediaweb.co.za]
Sent: 11 August 2006 02:32
To: Marais, EM, Dr <emm@sun.ac.za>
Subject: Identification problem

Dear Bettie

I would be very grateful if you could you please take a moment to see if it possible to identify the pelargonium in this drawing?

Thanks
Karen

Karen
I am at my Forestry office, not having my Pelargonium files with me. The illustration you have sent me seems to be Pelargonium bifolium (Burm.f.)Willd. I have this name and two other

names (P. trifidum (Burm.f.)Willd. And P. oxaloides (Burm.f.)Willd.), which I regard as unknown. This illustration shows six fertile stamens ('n kat se snorbaarde!!!!) and I do not have species in section Hoarea with six stamens. What you can say about the illustration is that it is an effort to a Pelargonium species, section Hoarea, but not scientifically correct and cannot be identified. Back in my other office I will check on this and if this is not the correct information I will let you know.

Bettie

From: Karen Stewart [mailto:karen@mediaweb.co.za] Sent: 11 August 2006 03:21 To: Marais, EM, Dr <emm@sun.ac.za> Subject: more questions

Sorry its me AGAIN.

Is Pelargonium trifidum Willd. what today is called Pelargonium incrassatum?

Thanks
Karen

No, Pelargonium trifidum Willd is not P. incrassatum. The correct information is in my other office. If you can get hold of the Pelargonium book Vol. 3. May be you will find the correct name at the back.

Bettie

-----Original Message-----
From: Karen Stewart [mailto:karen@mediaweb.co.za]
Sent: 15 October 2006 23:50
To: Marais, EM, Dr <emm@sun.ac.za>
Subject: Pel flowering

Morning Bettie

I am back to pondering my Pelargonium illustrations. I have found these 4 copies that have 4 stamens not 6 like the previous one I sent you for identification. I was wondering if there is a chance of an ID on this plant? I this file is too blurred, can I send you a 1MB file or is that too big?

Thanks
Karen

From: emm@sun.ac.za
Subject: RE: Pel flowering
Date: 17 October 2006 11:04:36 AM
To: karen@mediaweb.co.za

The illustrations: no I cannot identify them. There are some species with only four fertile stamens, but it is difficult to connect them to these drawings.
Bettie

Correspondence with Andrea Hart (Botany Library, Natural History Museum, London)

----Original Message----
From: Karen Stewart [mailto:karen@mediaweb.co.za]
Sent: 27 September 2006 21:19
To: Andrea Hart
Subject: Re: Notes...

Hi Andrea

When was the British Museum botany dept set up?

Thanks
Karen

Hi Karen,
Not the most straightforward of questions however:
From the *History of the Collections* (1904): "The Department of Botany, originally styled the Banksian Department, was established for the reception of the herbarium of Sir Joseph Banks, who had, shortly before his death in 1820, bequeathed it to Robert Brown, at whose demise it was to become the property of the British Museum: with Brown's consent, the herbarium might be removed to the Museum during his lifetime." From *The Natural History Museum at South Kensington* (Stearn, 1981). "Two major collections, those of Sir Hans Sloane (1660-1753) and Sir Joseph Banks (1743-1820), both long-serving Presidents of the Royal Society, form the historic basis of the Department of Botany. ... Thus in 1827 Brown agreed to the transfer of the Banks herbarium and library to Bloomsbury and he was officially appointed Under-Librarian with the designation of Keeper of the Sir Joseph Banks Botanical Collection (the Banksian Collection)." The natural history collections were moved from the British Museum (Bloomsbury) to the newly built Natural History Museum (South Kensington) in 1881 with a Botany Department in place.
Hope that helps!
Andrea

~~~~~~

Andrea Hart
Assistant Librarian, Botany Library
The Natural History Museum
Cromwell Road
London. SW7 5BD

Hi Karen,

Please find attached two images from the Geranium bifolium drawing from the Cape collection (no.56). The next email will have two images from no.60 of the same collection which is where the similarity I described in my earlier email lies.

btw. the name you have from the Petiver ms. is William Curruthers (1830-1922) who was the Keeper of the Botanical Department at the British Museum, 1871–95.
(the British Museum moved its natural history collections from Bloomsbury to the South Kensington site in 1881 and the building became know as the British Museum(Natural History) and more recently as we know it now - the Natural History Museum).

Cheers
~~~~~~

A.

----Original Message----
From: Karen Stewart [mailto:karen@mediaweb.co.za]
Sent: 25 October 2006 22:32
To: Andrea Hart
Subject: Re: MS Nr. 88 vs Sloane Ms

Thanks
Andrea you have helped me so much!

Karen
On 26 Oct 2006, at 10:46 AM, Andrea Hart wrote:
Hi Karen,

I'll go over to Special collections in a minute to have another look at the Petiver item however checking the Edwards text that you have:

"merely poor copies of 73 drawings in the collection of drawings of Cape plants which form Sloane Manuscript 5286 in the Natural History Museum, London (Edwards: 1968: 243).

It does actually read
"merely poor copies of 73 drawings in the collection of drawings of Cape plants which form Sloane Manuscript 5286 in the British Museum, London (Edwards: 1968: 243).

Unfortunately you'd have to contact the British Museum for a description as it is not held here.
Unsure too about Manuthus - will enquire with Archives once I've checked the volume.

Cheers
Andrea

----Original Message----
From: Karen Stewart [mailto:karen@mediaweb.co.za]
Sent: 25 October 2006 21:33
To: Andrea Hart
Subject: Re: MS Nr. 88 vs Sloane Ms

Dear Andrea

Thank you for your considered response. The problem is somewhat confusing!! I found that I had photographed the inside cover of M.S. No. 88, and have transcripted the notes here:
Banksian MS Nr. 88. British Museum, London. DESCRIPTION: A smallish leather-bound volume measuring 200 x 170 mm. It contains 73 watercolour sketches of South African plants. Each page contains a number in Petiver's hand in the top left-hand corner that begins with the letters G.N. (Gazophylacii naturae). The set was owned by English botanist James Petiver and many engravings that appear in Gazophylacii naturae correspond to drawings in this volume. There is a hand-written inscription by Manuthus (speeling could be wrong writing difficult to make out) dated 1892 in the front of the book which in part reads:

These are the 'original paintings' of some of the figures in the ninth decade of Petiver's Gazophylacii . The 100 figures in this decade are 'copied from original paintings taken from the living plants, viz, those which the State of Amsterdam presented to the Right Reverend the Bishop of London (Compton) when his Lordship was at the Congress there in A.D. 1691, with above fifty others painted from growing plants' (Petiver Decade 9 Gazophylacii naturae). This volume contains the latter drawings – see Petiver's observations in the letter press of this decade Tab. 187.4, he says 'I take this to be the same with the Bishop of London's paintings under Fig. 5, Pluk. Phtographia Tab. 187.4. although his Lordship's has but 3 flowers and the leaves set higher on the stalk' – see also tab 88 Figs. 1 & 2 . Contains 72 drawings (transcription from the original document).

This is the reason wht this document has been considered the collection
Petiver purchased from the Cape. However Edwards claims that they are: "merely poor copies of 73 drawings in the collection of drawings of Cape plants
which form Sloane Manuscript 5286 in the Natural History Museum, London (Edwards: 1968: 243).

I really do not know what Edwards based her assertions of "merely poor copies" on, perhaps its the quality of the art work. Was Manuthus a director of the library at any point? Or perhaps he was one of the previous owners of the book. I am very uncertain... I think I am just going to leave the unchanged transcript in and mention Edwards disagreement as I have done here.

Do you have a description of the Sloane MS?

Also thanks you for your corrections to my other notes, thats perfect, great!!!

Keep well
Karen
(A week to go!!!!)

On 25 Oct 2006, at 3:06 PM, Andrea Hart wrote:
Hi Karen,

I've re-read Edward's article on the Sloane mss and' interpret it as the following:

Banksian MS Nr. 88. British Museum, London.
A set of watercolour drawings owned by English botanist James Petiver (1663 or 4-1718).

Should read:
[73 rough drawings of Cape Plants copied from Sloane manuscript 5286 in the British Museum] forming Banksian Ms no.88. Botany Library, Natural History Museum, London.
A set of watercolour drawings owned by English botanist James Petiver.

Banksian Manuscript No. 88 has been considered to be the collection Petiver purchased from the Cape. This collection (Dryander, Cat. Bibl. Banks, Vol. 3, 178 and Natural History Museum Catalogue, Vol. 4, 1558) is however merely poor copies of 73 drawings in the collection of drawings of Cape plants which form Sloane Manuscript 5286 in the Natural History Museum, London (Edwards: 1968: 243).

Sloane Manuscript 5286. (c.1691) Natural History Museum, London. This manuscript is held in the British Museum, London (i.e. not us!)
A volume of plants growing about the Cape of Good Hope among which are the original paintings which the State of Amsterdam presented to Dr. Compton, Bishop of London when he was at the Congress there in 1691. They are figured for the most part in Petiver's Gazophylacium.

The Sloane Manuscript has been considered by some to have been the collection of Cape drawings given to Bishop Compton in 1691, although evidence in the text to Decade 9 of Petiver's Gazophylacium disproves this assumption (Edwards 1968: 243).
Unsure to a date for the Petiver ms but c.1690 would be my estimate.

Collection of watercolour drawings from the Cape, possibly by Voet, Burmann, Claudius, Oldenland, (c. 1685). Botany Library, Natural History Museum, London.
113 Sheets pasted into a bound book (this is incorrect as they are loose sheets).
You could use: Collection of 113 unmounted watercolours by various artists. Guy Tachard visited the Cape on two occasions, saw these Namaqualand drawings and presumably had copies made of sixteen which were engraved and published his Second Voyage to Siam (1689).

Collection of drawings by Francis Masson. Botany Library, Natural History Museum, London.
The leather bound portfolio of drawings is described in the catalogue as: 54 Watercolour drawings of plants, 9 of animals and 2 views of Niagara.

Should be: The leather bound portfolio of drawings is described in the catalogue as: [141 sheets of] Water-colour drawings of Plants from South Africa, Canaries, Azores, West Indies..etc. and 2 views of Niagara]. The volume contains an Ms. index at the rear.

Will get back to you about the Pelargonium sketch shortly.
Cheers
Andrea

-----Original Message-----
From: Karen Stewart [mailto:karen@mediaweb.co.za]
Sent: 13 October 2006 02:54
To: Andrea Hart
Subject: MS Nr. 88 vs Sloane Ms

Dear Andrea

OOOOh dear I don't seem to be able to cut the apron strings just yet!!!

I am going through all my illustrations and checking all my data, and I tried to decipher the message you sent me (see email below) that states:
Interesting comment about Fig.7 though with the same handwriting. A very similar (almost exact apart from the label that appears at the bottom of the image) drawing to that of Figure 7 is in the collection here as no.56 - the writing of the workd 'geranium' is virtually identical.

I am sure you are referring to the Pelargonium sketch, are you saying that you have two copies there of the same drawing?? Can you confirm this for me? (would be very exciting.. also if so where are they from??

Also I would be very grateful if you could just check that what I have written here about the manuscripts is correct. I have got myself inot a terrible muddle with regard to the Baksian No 88 and Sloane Ms. 5286. Is there a date for No 88?

So this is what I have:
Banksian MS Nr. 88. British Museum, London.
A set of watercolour drawings owned by English botanist James Petiver.

Banksian Manuscript No. 88 has been considered to be the collection Petiver purchased from the Cape. This collection (Dryander, Cat. Bibl. Banks, Vol. 3, 178 and Natural History Museum Catalogue, Vol. 4, 1558) is however merely poor copies of 73 drawings in the collection of drawings of Cape plants which form Sloane Manuscript 5286 in the Natural History Museum, London (Edwards: 1968: 243).

Sloane Manuscript 5286. (c.1691) Natural History Museum, London.
A volume of plants growing about the Cape of Good
Hope among which are the original paintings which the State of Amsterdam presented to Dr. Compton, Bishop of London when he was at the Congress there in 1691. They are figured for the most part in Petiver's Gazophylacium.

The Sloane Manuscript has been considered by some to have been the collection of Cape drawings given to Bishop Compton in 1691, although evidence in the text to Decade 9 of Petiver's Gazophylacium disproves this assumption (Edwards 1968: 243).

The caption to Decade 9 of Petiver's Gazophylacium reads: "Figures of one hundred elegant plants, all growing about the Cape of Good Hope and copied from original paintings taken from the living plants, viz, those which the State of Amsterdam presented to the Right Reverend the Bishop of London (Compton) when his Lordship was at the Congress there in A.D. 1691, and concludes "with above fifty others painted from growing plants lately purchased from the Cape" (Edwards 1968: 244).

Collection of watercolour drawings from the Cape, possibly by Voet, Burmann, Claudius, Oldenland, (c. 1685). Drawings CUP'D 58. Natural History Museum, London.
113 Sheets pasted into a bound book. Guy Tachard visited the Cape on two occasions, saw these Namaqualand drawings and presumably had copies made of sixteen which were engraved and published his Second Voyage to Siam (1689).

Collection of drawings by Francis Masson. Natural History Museum, London.
The leather bound portfolio of drawings is described in the catalogue as: 54 Watercolour drawings of plants, 9 of animals and 2 views of Niagara.

I hope that will be all I am to bother you with for a while...

Bye and have a nice weekend
Karen

Begin forwarded message:
From: "Andrea Hart" <Andrea.Hart@nhm.ac.uk>
Date: 01 September 2006 3:34:05 PM
To: "Karen Stewart" <karen@mediaweb.co.za>
Subject: RE: MS Nr. 88

Hi Karen,

The little book that you are referring to is the one with the daisies :-)

Have got the measurements of the other drawings for you. Have used the Fig number as you have but also added the page or drawing number in square brackets for further reference should the drawings need to be consulted again.

Fig.10 [No.60] 41 x 26 cm.
Fig.13 [p.26] 38 x 27 cm.
Fig.16 [p.40] 38.5 x 28 cm. Reprodued in Paterson's journeys, p.124

Fig. 19 [p.31] G.N. (Gazophylacii naturae) 84.1 : 20 x 17 cm.

Interesting comment about Fig.7 though with the same handwriting. A very similar (almost exact apart from the label that appears at the bottom of the image) drawing to that of Figure 7 is in the collection here as no.56 - the writing of the workd 'geranium' is virtually identical.

Hope that all makes sense - apologies for the delay in getting the info to you!
Please do also let me know if there is anything else you require - I'm happy to look over the final references to the drawings once you've completed them too.

Best wishes
Andrea

~~~~~~

Andrea Hart Assistant Librarian, Botany Library The Natural History Museum Cromwell Road London. SW7 5BD Tel : 020 7942 5842 Fax : 0207 942 5559 <http://library.nhm.ac.uk/>

Correspondence with Ted Oliver (Dept. Botany and Zoology, University of Stellenbosch)

Dear Karen

From David Mabberley's The Plant-Book

Bufonia L. (Caryophyllaceae), 20 species in Mediterranean area, 7 in the European region. The allegation that Linnaeus deliberately altered the generic name from Buffonia, commemorating Buffon, as a malicious pun on bufo (= toad) is said to be unfounded.

Well I am not sure about that; it surely could not have been a typo!
Linnaeus was known to have wielded his pen in getting back at opponents of his new sexual system of classification. The above seems to be a nice example.

Cheers
Ted

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SOUTH AFRICA

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