Hybrid ambitions : science, governance, and empire in the career of Caspar G. C. Reinwardt (1773-1854)

Weber, Andreas

Andreas Weber

Hybrid Ambitions

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LEIDEN UNIVERSITY PRESS

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Leiden University Press

Cover illustration: A field sketch of Reinwardt and his helpers made by Jannes Theodorus Bik during an expedition through West-Java in 1819. © Rijksmuseum Amsterdam, Album van schetsen en kleurteekeningen door J.Th. Bik nagelaten aan J.F. Bik. Signature: RP-T-1999-141.

Cover design: Maedium Utrecht
Lay-out: Andreas Weber

ISBN 978 90 8728 166 3
NUR 680

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PROEFSCHRIFT

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van Rector Magnificus prof. mr. P.F. van der Heijden,
volgens besluit van het College voor Promoties
te verdedigen op dinsdag 8 mei 2012
klokke 15.00 uur

door

ANDREAS WEBER

geboren te Ellwangen/Jagst (Duitsland)
in 1979

Promotiecommissie

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	prof. dr. M. Häberlein (University of Bamberg)
	dr. C. Smeenk (NCB Naturalis)

Meinen Eltern gewidmet

Contents

Acknowledgments

Researching and writing this dissertation has been a fascinating voyage. However, the ship would have never reached the safe shore without the help of numerous individuals and institutions that became involved in the project at different stages. First of all, I would like to thank Prof. Dr Eberhard Schmitt and Prof. Dr Mark Häberlein, both from the University of Bamberg. Owing to their support, I received a scholarship from the *Studienstiftung des deutschen Volkes* that afforded me the freedom and material means to come to the Netherlands. A generous grant by the *Gratama Stichting* eventually allowed me to finish the manuscript in the course of 2011.

This is also the moment to express my sincere gratitude to my supervisors who always took care that the ship did not wander too far off course. Thank you both, Lissa and Leonard, for wonderful and intellectually stimulating five years in Leiden!

When I arrived in the Netherlands in February 2007 as an external PhD student, the welcome at the Institute for History in Leiden was more than warm. I would like to thank Jorrit van den Berk, Karwan Fatah Black, Dr Ellen Cai, Natalie Everts, Fakih Farabi, Dr Sri Margana, Dr Harry Knipschild, Dr Binu Mailaparambil, Johannes Müller, Dr Chris Nierstrasz, Dr Damian Pargas, Bernhard Schär, Carolien Stolte, Dr Anjena Singh, Dr Alicia Schrikker, Dr Filipa Ribeiro da Silva, Dr Agus Suwignyo, Adul Wahid, Pham Thuy, Cynthia Viallé, Dr Job Weststrate, Hans Wilbrink, Cheng Weichung, and, of course all the ENCOMPASS students for a fantastic time in Leiden. Our many conversations during lunches, 'borrels', coffee breaks, and dinners were an ideal occasion to put the hassles of a PhD trajectory into perspective. I am especially grateful to dr. Bruno Miranda with whom I

shared an office for more than three years. Bruno now knows probably more about travelling naturalists than I do about the daily life of soldiers in Dutch Brazil. Thanks for inspiring and entertaining office hours! I would also like to express my gratitude to Dr Peter Meel, José Birker-van Herten, and, in particular, Marijke Wissen-van Staden who, from the first day on, took care that I was fully integrated in the Institute's cosmos. This was of tremendous help to make me feel at home in the Netherlands.

The ENCOMPASS conferences in Jakarta (2008) and Mumbai (2010) proved to be a unique chance to discuss initial findings with an audience of experts. The feedback I received from Prof. Dr Wim van den Doel, Prof. Dr Jos Gommans, Prof. Dr Charles Jeurgens, and Dr Thomas Lindblad was very helpful. I would also like to thank the members of the NEKOLIM group, which provided a firm platform to discuss drafts in an informal and cordial atmosphere. In particular the comments by Dr Marieke Bloembergen, Dr Eveline Buchheim, Dr Annelieke Dirks, Monique Erkelens, Dr Vincent Kuitenbrouwer, Dr Remco Raben, Bart Stol, and Esther Zwinkels helped to refine my arguments.

Another decisive moment of my PhD trajectory was the second Woudschoten conference on the *Circulation of Knowledge and Practices* in autumn 2007. From that moment on, I stayed in close contact with the lively and vibrant history of science community in the Netherlands. I am in particular grateful to Martin Weiss, Ab Filipse, Tim Nicolaije, Arjen Dijkstra, Dr David Baneke, Azadeh Achbari, Ilja Nieuwland, Fenneke Sysling, Dr Huib Zuidervaart, and Dr Laurens de Rooy for numerous conversations on all facets of nineteenth century science. Martin Weiss has also commented on the third chapter of this dissertation. I feel also indebted to Dr Marie-Odette Scalliet, Prof. Dr Rob Visser, Prof. Dr Peter Boomgaard, Prof. Dr Harm Beukers, and Prof. Dr Klaas van Berkel with whom I had long conversations at the outset of this project.

Eulàlia Gassó Miracle, Dr Chris Smeenk, and Robert-Jan Wille deserve special mention here. Each of them has contributed to the dissertation in a distinct way. Robert-Jan is a sparring partner for methodological questions since the conference in Woudschoten. I owe much to our intensive discussions on how the intertwined histories of knowledge production and Dutch colonialism can be and should be written. Chris Smeenk and Eulàlia Gassó Miracle, both attached to the Museum for Natural History in Leiden (NCB Naturalis), introduced me to the technical and material side of early nineteenth century natural history. The many conversations and the two courses on the Natuurkundige Commissie which

we taught together in 2011 were, in many respects, eye-openers to me. Thank you very much for sharing your extensive expertise!

Lincoln Paine, with his invaluable editing experience, helped to transform the final text into readable English. Chris Smeenk was also kind enough to read through the entire manuscript before I submitted it to the publisher.

I am also truly grateful to friends and family. Without their support and endurance to listen to endless PhD anecdotes, I would have never been able to finish this manuscript. I feel especially indebted to Casper Brienen, Erik Carree, Iris Costenoble, Boris Geiger, Simon Kaja, Gijs Kruijtzer, Stephan Michel, Job van der Meer, Murari Kumar Jah, Michèle Sons, Rita and Marius van Gelder, Miriam Weber, and the members of the former Leids Historisch Dispuut H.P.G. Quack.

Most of all, I thank Esther van Gelder. Your love and enthusiasm has served as incredible source of inspiration and energy during the last two years. You have also given this dissertation its final shape. Without your continuous pleas for more 'visual culture' in historical books, this study would have remained a textual wasteland. Moreover, all chapters have profited from your close reading.

My parents supported the PhD endeavor with immense enthusiasm from the very first day. This study is therefore dedicated to them.

Andreas Weber

Leiden, 4 March 2012

Introduction

In December 1814, Caspar Georg Carl Reinwardt (1773-1854), professor of chemistry, botany and natural history at the Athenaeum Illustre in Amsterdam, received the following letter from Anton Reinhard Falck (1777-1843), secretary of the Dutch king Willem I:

> It is time that we compensate for the harm we have inflicted on ourselves and the learned world. We should no longer miss the merits of knowing our colonies as thoroughly as our neighbours do. Java alone will give us the opportunity for important observations and discoveries regarding all realms of nature. . . . We need a man who unites shrewdness and broad expertise, and who has been working in the most prominent fields of science for years, and whose diligence will not be deterred and stymied by difficulties.[1]

[1] UB Leiden, BPL 2425, inv. 20. Letter Falck to Reinwardt, 13 December 1814: "Het is tijd dat wij de schade vergoeden aldus aan ons zelven en aan de geleerde wereld toegebracht. Ons moet niet langer de verdienste ontgaan van onze koloniën even grondig te kennen als onze naburen de hunne. Java alleen zal in alle de rijken der natuur tot de belangrijkste waarnemingen en ontdekkingen aanleiding geven. [. . .] Er is een man nodig, die aan groote scherpzinnigheid veel omvattende kundigheden paart en eene veeljarige beoefening der voornaamste wetenschappen, wiens ijver niet door gewone zwarigheden verdoofd en afgeschrikt worde . . . ".

In the succeeding paragraphs, the secretary revealed that Willem I (1772-1843) considered Reinwardt the most suitable person to investigate the Dutch colony in the East. Reinwardt, who in 1814 had already turned forty-two, initially doubted whether he really wanted to take on this challenge. Only after having expressed his reservations, he accepted the king's offer in a letter dated 26 December 1814, mentioning the generous financial prospect and the predictable scientific honours:

> The available knowledge of the inhabitants, . . . the land, and the great variety in nature of those countries [the Malay Archipelago] is too incomplete, further research would lead to new findings which would contribute to the enhancement of scientific knowledge in general as well as to the opening up of new exploitable resources, trade and prosperity. . . The one who first takes up this career will probably already reap the rewards . . . of important discoveries.[2]

Immediately after Reinwardt's confirmation, preparations were made for his trip to the Malay Archipelago. During his six-year stay in the Netherlands Indies, Reinwardt travelled to the interior of Java and carried out a large sea expedition to the Lesser Sunda Islands, the Moluccas and Celebes. The hinterlands of the Dutch settlements on these islands had remained terra incognita to European naturalists and colonial administrators.[3]

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[2] W.H. de Vriese and J. Pijnappel (eds.). *Reinwardt's Reis naar het oostelijke gedeelte van den Indischen Archipel, in het jaar 1821* (Amsterdam: Frederik Muller, 1858), 30. Letter Reinwardt to Falck, Amsterdam, 26 December 1814: "De kennis welke wij tot nogtoe van de inwoonderen, de gesteldheid en den aard der gronden, derzelver voortbrengend vermogen en van de groote verscheidenheid der natuurlijke voortbrengselen dier landen bezitten, zijn te onvolledig, dan dat men zich niet van verdere nasporingen daaromtrent nog vele ontdekkingen beloven konde, die ter uitbreiding van wetenschappelijke kennis in het algemeen, zoowel als ter opening van nieuwe bronnen van bedrijf, handel en welvaart dienstig zijn zullen; en ook hij die het eerste deze loopbaan betreedt, zal misschien reeds de vruchten kunnen oogsten, die het loon zijn van belangrijke ontdekkingen, en de drijfveer en het doel van wetenschappelijk onderzoek."

[3] Ch. Jeurgens, "Op zoek naar betrouwbare informatie. De commissarissen-generaal en de stichting van de koloniale staat, 1816-1819," in *Het verre gezicht. Politieke en culturele relaties tussen Nederland en Azië, Afrika en Amerika*, ed. J. Thomas Lindblad et al. (Franeker: Uitgeverij van Wijnen, 2011), 266-85; E. Tagliacozzo, *Secret trades, porous borders. Smuggeling and states along the Southeast Asian frontier, 1865-1915.* (New Haven:

When Reinwardt eventually left Batavia in 1822, Willem I had already approved the foundation of a special committee, the Committee for Natural History of the Netherlands Indies (Natuurkundige Commissie voor Nederlandsch-Indië) to continue Reinwardt's field work in the far-flung Archipelago.

Until its dissolution in 1850, the members of the committee explored various parts of the Malay Archipelago. Heinrich Kuhl (1797-1821), Gerrit Laurentius Keultjes (1786-1821), Johan Conrad van Hasselt (1797-1823), Heinrich Boie (1794-1827), Heinrich Christian Macklot (1799-1832) and Pierre-Médard Diard (1794-1863) specialized in the collection, description and preparation of animals, minerals and plants and investigated the environs of Batavia and the western parts of Java in the 1820s. Macklot, the gardener Alexander Zippelius (1797-1828), the draftsmen Pieter van Oort (1804-1834), and the taxidermists Gerrit van Raalten (1797-1829) and Salomon Müller (1804-1864), for example, set out on board of the navy corvette *Triton* for a large sea expedition to New Guinea, Timor, Celebes and Amboina in 1827. Their research was later continued by the bird collector Eltio Alegondas Forsten (1811-1843) and Heinrich von Gaffron (1813-80). In 1833, Müller and the botanist Pieter Willem Korthals (1807-1892) travelled to the Padang region on Sumatra's west coast to carry out natural historical research. Later Ludwig Horner (1811-1838) and Carl Anton Ludwig Maria Schwaner (1817-1851), both geologists, were sent to explore the interior of Borneo, the biggest island in the far-flung Malay Archipelago. Many of these travellers relied on the growing infrastructure of the Royal Dutch Navy in the region.[4]

Yale University Press, 2005), 29; and E. Tagliacozzo, "The lit archipelago. Coast lighting and the imperial optic in insular Southeast Asia, 1860-1910," *Technology and culture* 46:2 (2005): 306-28.

[4] For more details on these individuals and their fieldwork in the region: Ch. Klaver, *Inseparable friends in life and death. The life and work of Heinrich Kuhl (1797-1821) and Johan Conrad van Hasselt (1797-1823), students of prof. Theodorus van Swinderen* (Groningen: Barkhuis, 2007); T. Hildenhagen, "Das kurze Leben des Dr. h.c. Heinrich Kuhl (1797-1821) und seine herpetologischen Beiträge," *Sekretär* 10:2 (2010), 40-59; R. Barnes, "Recording cultures. Collecting in eastern Indonesia," in *Colonial collections revisited*, ed. Pieter ter Keurs (Leiden: CNWS, 2007), 203-19; C.H.J.M. Fransen, L.B. Holthuis, and J.P.H.M. Adema, "Type-catalogue of the Decapod Crustacea in the collections of the Nationaal Natuurhistorisch Museum, with appendices of pre-1900 collectors and material," *Zoologische Verhandelingen* 311 (1997): 270-5; M.J. Sirks, *Indisch natuuronderzoek. Een beknopte geschiedenis van de beoefening der natuurwetenschappen in de Nederlandsche koloniën* (Amsterdam: Koloniaal Instituut,

Figure 1: View on board the navy corvette, *Triton,* sailing to New Guinea in May/June 1828. The drawing on which the lithograph is based was made by Pieter van Oort, one of the draftsmen of the Natuurkundige Commissie.

The aim of those early survey operations was twofold. On the one hand, Reinwardt and the members of the Committee for Natural History had to serve the emerging colonial state which aimed at the exploitation of the overseas possessions.[5] They were thus regularly instructed to help the colonial authorities find practical and feasible solutions to pressing issues such as the production of saltpetre, the minting of silver coins, the

1915), 86-140; M.J. van Steenis-Kruseman, *Cyclopaedia of Malesian collectors*, accessed May 6, 2011, http://www.nationaal herbarium.nl/fmcollectors/Home.htm; H.J. Veth, *Overzicht van hetgeen, in het bijzonder door Nederland, gedaan is voor de kennis der fauna van Nederlandsch-Indië* (Leiden: Van Doesburgh, 1879). For an overview of the infrastructure and mapping projects of the Dutch navy in the Netherlands Indies see J.M. Mohrmann, "De Koninklijke Marine als vernieuwer van de zeevaartkunde, 1850-1900," *Tijdschrift voor Zeegeschiedenis* 22:1 (2003): 44-58.

[5] W. van den Doel, *Zo ver de wereld strekt: De geschiedenis van Nederland overzee vanaf 1800.* (Amsterdam: Bert Bakker, 2011), 15-94; M.C. Ricklefs. *A history of modern Indonesia since c. 1200* (Stanford, California: Stanford University Press, 2001), 143-89; Th. Stevens, *Van der Capellen's koloniale ambitie op Java. Economisch beleid in een stagnerende conjunctuur, 1816-1826* (Amsterdam: Historisch Seminarium van de Universiteit van Amsterdam, 1982), chapter VIII.

organization of the school and health systems, the introduction of standardized weights and measures, the cultivation of various cash crops, and the detection of natural resources such as gold and coal. Moreover, some of them were asked to map unprospected peripheral regions and to gain statistical information on the societies they encountered in the field. On the other hand, Reinwardt and the members of the Committee for Natural History acted as collectors for the National Museum of Natural History ('s Rijks Museum van Natuurlijke Historie) and the National Herbarium ('s Rijks Herbarium).

The National Museum and the National Herbarium were both founded in the 1820s. Since Willem I sought to establish his new kingdom as one of Europe's leading powers, both institutions were intended to illustrate and manifest the scientific pride and glory of his monarchy.[6] To compete with similar institutions in Paris, London, Berlin, Geneva, and Vienna, the directors of the National Museum of Natural History and the National Herbarium quickly set up a vast network of collectors which covered Europe, the Gold Coast in West Africa, South Africa, Egypt, Japan, North and South America and, most important, the Dutch possessions in Asia, which owing to their rich biodiversity, formed a wealthy source for the expanding natural historical collections in the Netherlands.[7]

The large survey and collecting operations of Reinwardt and the members of the Committee for Natural History formed the basis for the rising reputation of the Dutch kingdom as a well-known centre for natural historical research in Europe in the nineteenth century. Large numbers of boxes with natural historical specimens, diaries, field notes, sketches and illustrations reached Leiden in the first half of the nineteenth century and

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[6] R. Effert, *Royal cabinets and auxiliary branches. Origins of the National Museum of Ethnology, 1816-1883* (Leiden: CNWS, 2008), 17-22. For Willem I's political ambitions, see N.C.F van Sas, "Het grote Nederland van Willem I: een schone slaapster die niet wakker wilde worden," in *Staats- en natievorming in Willem I's koninkrijk (1815-1830)*, ed. C.A. Tamse, et al. (Brussel: Vubpress, 1992), 171-85. For a comparison of the museums in France, Britain and the Dutch Kingdom, see R. Langebeek, "Les musées d'histoire naturelle de Leyde, Paris et Londres. Analyse de l'évolution et du mode d'exposition des objets de musées d'histoire naturelle jusqu'aux premières années du XIX siècle" (PhD diss., Muséum National d'Histoire Naturelle, Paris, 2010).

[7] For an overview of the collecting networks of the National Museum for Natural History and the National Herbarium, see A. Gijzen, *'s Rijks Museum van Natuurlijke Historie, 1820-1915* (Rotterdam: W.L. & J. Brusse's Uitgeversmaatschappij N.V., 1938), 86-194; and M.J. van Steenis-Kruseman, "The collections of the Rijksherbarium," *Blumea* 25 (1979): 13-26.

provided the collections of the National Museum and the National Herbarium with a rapidly growing number of items.

Figure 2: Watercolour drawing of a red-throated barbet. The drawing was made by Pieter van Oort in Buitenzorg, Java, May 1827.

Moreover, several sumptuous publications and articles on the flora and fauna of the Netherlands Indies came off the press. Many of these publications were initiated and edited by the directors of the National Museum and the National Herbarium. Descriptions and illustrations of collected mammals were published in the *Monographies de mammalogie* (1827-41). Birds were described in the *Nouveau recueil de planches coloriées d'oiseaux* (1820-39), and newly discovered plants in the *Flora Javae nec non insularum*

adjacentium (1826-56). A general overview of the field work was given in the three lavishly produced volumes of the Proceedings on the Natural History of the Dutch Overseas Possessions (*Verhandelingen over de Natuurlijke Geschiedenis der Nederlandsche Overzeesche Bezittingen*) which appeared in several instalments between 1839 and 1847.[8]

This brief overview of early nineteenth-century Dutch colonial surveying and collecting projects allows a first glimpse of the rich material, visual and textual outcomes of these endeavours. Many of the items are now scattered among museums and archives in Indonesia and the Netherlands. Taken together, the material provides a strong lens through which to view the intricate relationship between domestic and colonial governance and science in the early nineteenth century in the context of the Dutch empire. Owing to the unexpected abundance of archival material, this study focuses on the career of Caspar Georg Carl Reinwardt, the first in a long line of mentioned colonial travellers in and surveyors of the Netherlands Indies. This focus has two major advantages. On the one hand, it allows us to provide a firm historical basis for further analyses of other individuals and institutions involved. On the other hand, it shows that neither these travellers nor their material and textual bequests can be fully understood if they are not carefully embedded in their wider social, cultural, political, and economic context. Only then can individuals such as Reinwardt and his travelling successors function as a powerful heuristic tool to provide a combined history of science *and* empire, areas of inquiry that, up to now, have too often been treated as two distinct historical narratives.

Historiography

By focusing on the career of the traveller and administrator Reinwardt, this study differs from existing studies in the field of Dutch colonialism and science. While several historians have provided insightful and useful descriptions and summaries of various projects of scientific inquiry in the Netherlands Indies[9], others have based their narratives on issues such as the

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[8] Gijzen, *'s Rijks Museum van Natuurlijke Historie*, 240-42; and C.G.G.J. van Steenis, "The Rijksherbarium and its contribution to the knowledge of the tropical Asiatic flora," *Blumea* 25 (1979): 59-62.

[9] P. Boomgaard, "The making and unmaking of tropical science. Dutch research on Indonesia, 1600-2000," *Bijdragen tot de Taal-, Land- en Volkenkunde* 162: 2/3 (2006): 191-217; K. van Berkel, *A history of science in the Netherlands. Survey, themes and reference*

diffusion of 'pure' sciences to colonial areas (Lewis Pyenson) or the failure of enlightened science in colonial and post-colonial Indonesia (Andrew Goss).[10] In particular Pyenson's attempt to separate 'colonialism' and 'science' in the nineteenth and early twentieth century into two independent narratives has received much scholarly criticism. According to the historians of science Paolo Palladino and Michael Worboys, Pyenson

> . . . wishes to draw attention to the value of the scientific mode of inquiry as one of the highest intellectual achievements of Enlightenment. By chronicling the great "civilizing mission" of the "exact" sciences, Pyenson seeks to challenge the contextualist and relativist programs of social historians and sociologists. He believes that if the dominant historical movement of the late nineteenth and early twentieth century, namely "savage and ubiquitous" imperialism, can be shown to have had no influence on the physical and astronomical sciences he studies, then those programs are worthless.[11]

Goss's analysis is more nuanced but shares the disadvantage that it also departs from a normative notion of how science should have developed in the Malay Archipelago. In his view the continuous intervention of the colonial and post-colonial state prevented the seeds of 'enlightened' science

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(Leiden: Brill, 1999), 210-28; H. Maat, *Science cultivating practice. A history of agricultural science in the Netherlands and its colonies 1863-1986* (Wageningen: Ponsen & Looijen, 2001); P. Honig and F. Verdoorn, eds., *Science and scientists in the Netherlands Indies* (New York: Board for the Netherlands Indies, Surinam and Curaçao, 1945); Sirks, *Indisch natuuronderzoek*; H.J. Veth. *Overzicht van hetgeen, in het bijzonder door Nederland, gedaan is voor de kennis der fauna van Nederlandsch Indië*. Leiden: Van Doesburgh, 1879. A noteworthy exception is the papers of the first and third conferences, on the transfer of science and technology between Europe and Asia since Vasco da Gama (1498-1998), in 1991 and 1994. The papers are published as the third and sixth volumes of the *Journal of the Japan-Netherlands Institute*.

[10] L. Pyenson, *Empire of reason. Exact sciences in Indonesia, 1840-1940* (Leiden: Brill, 1989). Similar and more recently, L. Pyenson, "The enlightened image of nature in the Dutch East Indies: Consequences of postmodernist doctrine for broad structures and intimate life," *Historical studies in the natural sciences* 41: 1 (2011): 1-40 and A. Goss, *The Floracrats. State-sponsored science and the failure of enlightenment in Indonesia* (Madison: University of Wisconsin Press, 2011).

[11] P. Palladino and M. Worboys, "Science and imperialism," *Isis* 83:1 (1993): 92.

from falling on fertile ground in colonial and post-colonial Indonesia. Seen from this perspective, it does not surprise that every scientific inquiry in the region must appear as, as Goss puts it, a "footnote in the history of science".[12]

Unlike the work of historians such as Pyenson and Goss, it is not the intention of this study to judge the scientific and administrative achievements of 'scientists' in colonial and post-colonial Indonesia. It wants rather to illustrate that 'science' can never be seen as a category disconnected from its social, political, and economic environment. In particular in the decades around 1800, 'science' was a co-evolutionary endeavour that both shaped and was shaped by the milieu in which it developed.[13] To substantiate this claim it is necessary to briefly shed light on recent discussions in history of science.

While the traditional historiography of science assumes that scientific and other forms of knowledge developed in early modern Europe and subsequently spread to the rest of the world through processes of diffusion,[14] historians who use the more globally oriented 'circulation of knowledge' approach sketch a more nuanced picture. Instead of viewing the movement of supposedly superior Western knowledges (such as trained humans, machines, instruments, notes, practices, or concepts, etc.) as a unidirectional flow from the West to the rest of the world, these studies highlight the historical contingency and the alteration of existing knowledges and practices which circulation entailed.[15]

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[12] Goss, *The floracrats*, 4. For a more detailed elaboration of this point see my review of Goss' study in the *Bijdragen tot de Taal-, Land- en Volkenkunde* 167:2/3 (2011): 340-342.

[13] This claim is further explored in, for instance, B. Latour, "Postmodern? No, simply amodern! Steps towards an anthropology of science," *Studies in history and philosophy of science* 21:1 (1990): 145-171. And for a case study on the shifting identity of 'botanists' at the end of the eighteenth century see: E.C. Spary, "Of nutmegs and botanists. The colonial cultivation of botanical identity," in *Colonial botany. Science, commerce, and politics in the early modern world*, ed. L. Schiebinger et al. (Philadelphia: University of Pennsylvania Press, 2005), 187-203.

[14] G. Basalla, "The spread of western science," *Science* 156:3775 (1967): 611-22.

[15] A good overview of discussions in the field can be found in S. Sivasundaram, "Sciences and the global: On methods, questions and theory," *Isis* 101:1 (2010): 146-158; L. Roberts, "Situating science in global history. Local exchanges and networks of circulation," *Itinerario* 23:1 (2009): 9-30; S.G. Solomon, "Circulation of knowledge and the Russian locale," *Kritika: Explorations in Russian and Eurasian history* 9:1 (2008): 9-26; F. Fan, "Science in cultural borderlands: methodological reflections on the study of science, European

The philosopher of science Bruno Latour has even developed a model to get an analytical grip on the reconfiguration of knowledge on the move. Latour suggests that metropolitan actors tried to use travelling naturalists as calibrated tools to bridge the epistemological and geographical gap between foreign sites, where field work was done, and scientific institutions at home.[16] Or, in the words of David Livingstone, a historical geographer who uses Latour's model in his programmatic study *Putting science in its place*: "Those *absent* from some space of knowledge production needed to find ways of assuring themselves that those *present* had gathered information in an appropriate manner."[17] In order to guarantee that sedentary naturalists in Amsterdam, Vienna, Berlin, Paris and London were able to interpret the knowledge accumulated in the field, several calibrating strategies had to be applied. These ranged from careful preparatory training to concrete and detailed instructions of how foreign sites should be explored, observed, mapped, described, measured and pictured. Among the primary carriers of this global exchange of knowledge were, for instance, the trade networks established by the British and Dutch East India Companies.[18]

Latour offers as a model the work of the French navy officer Jean-François de Galaup, comte de La Pérouse (1741-1788), in the Pacific Ocean in the late 1780s. The French king Louis XVI (1752-1793) had commissioned La Pérouse to map the entire ocean in order to gain a strategic and economic advantage over the British, who had imposed their rule over large parts of the Indian subcontinent.[19] In 1787, La Pérouse and his crew—

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imperialism, and cultural encounter," *East Asian science, technology and society* 1 (2007): 213-31; and J.A. Secord, "Knowledge in transit," *Isis* 95:4 (2004): 654-72.

[16] B. Latour, *Science in action: How to follow scientists and engineers through society* (Cambridge: Harvard University Press, 1987), 215-57.

[17] D. Livingstone, *Putting science in its place: geographies of scientific knowledge* (Chicago: University of Chicago Press, 2003), 147.

[18] The link between European trading companies and knowledge production is further explored in S. Huigen, J.L. de Jong, and E. Kolfin, eds., *The Dutch trading companies as knowledge networks* (Brill: Leiden, 2010); H.J. Cook, *Matters of exchange. Commerce, medicine, and science in the Dutch Golden Age* (New Haven: Yale University Press, 2007); L. Blussé and I. Ooms, eds., *Kennis en compagnie: de Verenigde Oost-Indische Compagnie en de moderne wetenschap* (Amsterdam: Balans, 2002); and S.J. Harris, "Long-distance corporations, big science and the geography of knowledge," *Configurations* 6:2 (1998): 269-304.

[19] For an overview of French and British expeditions to the Pacific Ocean in the 1780s, see P.J. Marshall and G. Williams, *The great map of mankind. British perceptions of the world in the age of enlightenment* (London: J.M. Dent & Sons, 1982), chapter 9.

which consisted of, among others, astronomers, botanists, artists and mineralogists—set foot on Sakhalin in the Northern Pacific. At first, the explorer did not know whether Sakhalin was an island or a peninsula connected with Asia. Even the maps and older travel books which they had on board of their ship, the *L'Astrolabe*, gave contradictory evidence. When they encountered a few inhabitants, the French learned that Sakhalin was indeed an island. One of the Chinese inhabitants even sketched a rough map of the area in La Pérouse's notebook.

The local geographical knowledge La Pérouse was able to gather at Sakhalin and other places in the Pacific subsequently reached the navy headquarter in Versailles in the form of notebooks, maps, sketches and tables with measurements. In Versailles—the "centre of calculation" in Latour's words—the local knowledge was subsequently transformed and appropriated into standardized, universally valid and stable forms of knowledge such as maps and globes. These "immutable mobiles", as Latour dubs them, eventually circulated from Versailles to London, Berlin, and Amsterdam and functioned as an inspiration for later expeditions to the Pacific region to accumulate additional knowledge of the region's geography, economy and societies which would in turn be analysed and reworked in Europe. Latour's circulatory model thus provides fertile ground for narratives transcending the notion that 'scientific' knowledge was an exclusive product of the Western world spreading gradually to non-European areas. The model rather insinuates that 'scientific' knowledge must be seen as the contingent product of myriad local encounters at various sites around the globe.

Although Latour stresses the importance of encounters at non-Western sites for the formation of 'scientific' knowledge, his model fails to get an analytical grip on the micro-histories of the localities that constituted the spatial, intellectual and material framework for such encounters. By providing in-depth analyses of figures and institutions *in between* in key regions such as Northern America, the Atlantic world, South America, the Caribbean, the Malay Archipelago, the Pacific region, India, or China, historians such as Fa-ti Fan, Londa Schiebinger, Kapil Raj, James Delbourgo, David Turnbull, Lissa Roberts, Jane Camerini, James H. Merrell, Richard White and others have shown that encounters at these sites were far from being simple endeavours. [20] Their case studies demonstrate that the

[20] See, for instance, M. Häberlein, and A. Keese, eds., *Sprachgrenzen – Sprachkontakte – kulturelle Vermittler. Kommunikation zwischen Europäern und Außereuropäern. (16.-20. Jahrhundert)* (Stuttgart: Franz Steiner Verlag, 2010); S. Schaffer, L. Roberts, K. Raj, and

accumulation of knowledge in those regions was often based on a series of multi-layered and highly contingent interactions in which local institutions, nature, skills, networks and agents played a crucial role. Seen from this perspective, the creation of knowledge *on the spot* is not the result of *one* decisive encounter, as Latour puts, but rather the outcome of complex interactions between human and non-human actors at certain places and times in the past.[21]

The same point can be made for the European side of Latour's model. In recent years various scholars have convincingly shown that the transformation of local knowledge into universally valid 'scientific' knowledge in Europe was a rather intricate and contingent endeavour in which competition and rhetoric played a crucial role. The huge influx of information that reached Europe in the form of maps, notes, illustrations, sketches, tables, specimens, ship journals, field diaries, and the like in the late

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J. Delbourgo, eds., *The brokered world. Go-betweens and the global intelligence, 1770-1820* (Sagamore Beach, MA: Science History Publications, 2009); J. Delbourgo and N. Dew, eds., *Science and empire in the Atlantic world* (New York: Routledge, 2008); K. Raj, *Relocating modern science. Circulation and the construction of knowledge in South Asia and Europe, 1650-1900* (Basingstoke: Palgrave Macmillan, 2007); S. Moon, *Technology and ethical idealism. A history of development in the Netherlands East Indies* (Leiden: CNWS, 2007); F. Fan, *British naturalists in Qing China: Science, empire, and cultural encounter* (Cambridge: Harvard University Press, 2004); L. Schiebinger, *Plants and empire. Colonial bioprospecting in the Atlantic World* (Cambridge: Harvard University Press, 2004); D. Turnbull, *Masons, tricksters and cartographers: comparative studies in the sociology of scientific and indigenous knowledge* (Amsterdam: Harwood Academic, 2000); J.H. Merrell, *Into the American woods. Negotiators on the Pennsylvania frontier* (New York: Norton, 1999); J. Camerini, "Wallace in the field," *Osiris* 11 (1996): 44-65; V. Houben, *Kraton and Kompeni. Surakarta and Yogyakarta, 1830-1870* (Leiden: KITLV Press, 1994); N. Thomas. *Entangled objects: Exchange, material culture, and colonialism in the Pacific* (Cambridge: Harvard University Press, 1991), and R. White. *The middle ground. Indian, empires, and republics in the Great Lakes region 1650-1815* (Cambridge: Cambridge University Press, 1991).

[21] On the 'situatedness' of science in general see Ch.W.J. Withers and D.N. Livingstone, "Thinking geographically about nineteenth century science," in *Geographies of nineteenth-century science*, ed. D.N. Livingstone et al. (Chicago: University of Chicago Press, 2011): 1-19; D.A. Finnegan, "The spatial turn: geographical approaches in the history of science," *Journal of the history of biology* 41:2 (2008): 369-88; D. Edgerton, *The shock of the old: technology and global history since 1900* (London: Profile Books, 2006); S. Shapin, "Placing the view from nowhere: historical and sociological problems in the location of science," *Transactions of the institute of British geographers* 23:1 (1998): 5-12 and A. Pickering, *The mangle of practice. Time, agency & science* (Chicago: University of Chicago Press, 1995), introduction.

eighteenth and early nineteenth centuries caused severe tensions among different groups of professionals (museum directors, travellers, administrators) about how the material had to be appropriated and used. A brief discussion of the work and career of the famous cameralist and traveller Alexander von Humboldt (1769-1859), sheds some light on the rising tensions among institutions and individuals within Europe's metropoles.

Von Humboldt and his French companion Aimé Jacques Alexandre Bonpland (1773-1858), a plant expert, reached the Spanish American colonies in 1799. At that time Von Humboldt was a well-known administrator and mining expert who had managed to transform the mines of the Prussian domains of Ansbach and Bayreuth into profitable endeavours. Due to a large bequest from his mother's side, Van Humboldt was eventually able to quit his work as mining inspector and shift his focus on his career as travelling naturalist.[22]

During their five years in South America, Von Humboldt and Bonpland made extensive journeys in the region and accumulated an incredible number of specimens, measurements and observations. Both *voyageurs* returned to Paris in 1804. While Bonpland received a position as gardener at Château de Malmaison, a property of Napoleon Bonaparte's wife, Joséphine de Beauharnais (1763-1814), Von Humboldt continued his career as travelling naturalist by transforming his field notes and observations into a multi-volume travel account written in French and in German.[23] The first volumes of his narrative came off the press in 1805, one year after his return. In order to meet the expectations of his European audience and to claim the status and authority of a scientific hero, Von Humboldt used his account as a vehicle for fashioning himself as an intrepid, manly and solitary voyageur who had mastered the perils of travelling through untamed and dangerous nature in South America.[24]

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[22] For Von Humboldt's early career as mining inspector, see this slightly dated but still valuable biography, H. Beck, *Alexander von Humboldt,* vol. 1, *Von der Bildungsreise zur Forschungsreise 1769-1804* (Wiesbaden: Franz Steiner Verlag, 1959), chapter 2. For a more recent analysis see: U. Klein, "The Prussian mining official Alexander von Humboldt," *Annals of Science* 69:1 (2012): 27-68.

[23] For detailed analyses of the processing of his botanical findings in Europe, see, for instance, H.W. Lack, *Alexander von Humboldt und die botanische Erforschung Amerikas* (München: Prestel, 2009).

[24] See, for instance, M.L. Pratt, *Imperial travel eyes. Travel writing and transculturation* (New York: Routledge, 2008), chapter 6; and D. Outram, "New spaces in natural history," in *Cultures of natural history,* ed. N. Jardine et al. (Cambridge: Cambridge

Although travelling through Spain's overseas empire was certainly a challenging endeavour, Von Humboldt remained mostly silent about how he went about acquiring the information he discusses in his published narrative. He does not mention the colonial infrastructure much less the skills and knowledge of a broad array of local helpers such as gardeners, porters, fishermen, civil servants, translators, hunters, and guides who helped him and Bonpland cope with the complexity of the South American landscape. One must also not forget that Von Humboldt was also allowed to use the results of earlier large-scale surveys of the region which the Spanish Bourbons had launched in the second half of the eighteenth century. Like the governments of Sweden, France, and Britain, the Spanish rulers had undertaken major efforts to investigate and 'improve' the exploitation of their overseas territories in the aftermath of the Seven Years' War (1756-1763).[25] Von Humboldt's proto-ecological approach to nature, which historians later labelled as 'romantic' or 'humboldtian science', was thus firmly rooted in a political climate where the improvement of agriculture, economy and society played a decisive role.[26]

University Press) 1996, 249-65. Pratt's and Outram's readings of Von Humboldt stand in stark contrast to the rather ahistorical work of the Berlin literary historian Ottmar Ette. Ette tends to praise Von Humboldt for his advanced research techniques and creative way of organizing and narrating different forms of knowledge. In one of his more recent studies, Ette, for instance, depicts Von Humboldt as a mentor whose research techniques and narratives should be considered as tools to get a better understanding of our globalized world; see O. Ette, *Alexander von Humboldt und die Globalisierung* (Frankfurt am Main: Insel, 2009) and also the platform http://www.avhumboldt.de/.

[25] D. Bleichmar, "Atlantic competitions. Botany in the eighteenth-century Spanish Empire," in *Science and Empire in the Atlantic world*, ed. J. Delbourgo et al. (New York: Routledge, 2008), 225-52.; J. Cañizares-Esguarra, "How derivate was Humboldt? Microcosmic nature narratives in Early Modern Spanish America and (other) origins of Humboldt's ecological sensibilities," in *Colonial botany. Science, commerce, and politics in the Early Modern world*, ed. L. Schiebinger et al. (Philadelphia: University of Pennsylvania Press, 2005), 148-65 and in particular 158-61; A. Lafuente, "Enlightenment in an imperial context: Local science in the late-eighteenth century Hispanic world," in *Nature and Empire. Science and the colonial enterprise*, ed. R. MacLeod (Chicago: University of Chicago Press, 2000), 155-73. For a general overview of projects of 'improvement' in Europe and overseas see: R. Drayton, *Nature's government. Science, Imperial Britain and the 'Improvement' of the world* (New Haven: Yale University Press, 2000), chapters 3 and 4.

[26] The label 'Humboldtian science' was introduced by S.F. Cannon, *Science in culture: The early modern period.* (New York: Science History Publications, 1978), chapter 4. For a critical evaluation of that label, see M. Dettelbach, "Humboldtian science," in *Cultures*

Von Humboldt eventually used his new social status as heroic travelling naturalist to promote an analysis and view of nature that substantially diverged from notions his fellow naturalists at the Muséum national d'histoire naturelle in Paris had developed. In particular his claim that only the measurement, observation and the sensual perception of nature in "the field" would unravel the laws of nature contradicted the work of his influential sedentary colleague Georges Cuvier (1769-1832) who held a professorship in natural history at the Muséum. According to Cuvier, the proper investigations of nature had to be carried out at the Muséum where field specimens were prepared, examined and carefully compared, for only the careful comparison of specimens would be able to unravel the secrets and wealth of nature. For Cuvier, Von Humboldt's fieldwork was nothing more than a superficial, fragmentary and insecure endeavour. Cuvier also heavily criticized Von Humboldt's attempts to fashion himself as intrepid traveller. In the end, travellers such as Von Humboldt thus remained unpredictable tools. Instead of fully facilitating metropolitan interests, they rather used their new authority to question and destabilize established ways of investigating nature.[27]

The brief discussion of case studies of the production of knowledge *on the spot* and the difficulties, tensions and intellectual labour to transform and appropriate such local knowledge in Europe, clearly shows the limits of Latour's model. The main disadvantage of Latour's model is its inability to get an analytical grip on the micro-histories of knowledge production at localities in Europe and elsewhere. In particular Latour's notion that both the transfer of geographical knowledge at the beach of Sakhalin as well as the transformation of field notes into universally valid cartographical knowledge was the result of *one* decisive moment remains too fuzzy to serve as a heuristic tool. Whether in Europe or 'in the field', the meaning and concrete shape of knowledge were constantly under negotiation.

The major advantage of Latour's model, however, is that it helps to overcome simple dichotomies on which scholars such as Peyenson and to a

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of natural history, ed. N. Jardine, et al. (Cambridge: Cambridge University Press, 1996), 287-304, M. Dettelbach, "Alexander von Humboldt. Between enlightenment and romanticism," *Northeastern Naturalist* 1 (2001): 9-20 and Klein, "The Prussian mining official Alexander von Humboldt". For an attempt to root Von Humboldt's plant geography in German Romanticism, see M. Nicholson, "Alexander von Humboldt, Humboldtian science, and the origins of the study of vegetation," *History of Science* 25 (1987), 167-94.

[27] Outram, "New spaces in natural history," 249-65.

lesser extent Goss have based their historical narratives in a Dutch colonial context. Reflecting upon Latour's model thus prevents historians from considering colonialism/imperialism and the emergence of modern science as two separate stories. It also offers fertile ground for analyses that study the emergence of 'scientific' knowledge as the contingent outcome of a series of local encounters at sites connected by the circulation of objects, specimens, people, notes, illustrations, drawings, tables, and so on. Instead of assuming that 'scientific' knowledge was exclusively produced by Westerners and their institutions and then spread to the rest of the world by diffusion, such a notion rather integrates non-Western sites and agents as crucial but hidden pillars of modern science. Latour's model thus paves the way for a more balanced narrative weaving the various micro-histories of knowledge production together into a panoramic tableau revealing the interconnectedness and co-evolutionary character of science, governance, and empire in the decennia around 1800.

Structure and Content

Figures such as Reinwardt who made their career at the crossroads of the mentioned fields are perfect tools for making this complex relationship visible. The in-depth analyses of Reinwardt's career in Amsterdam, Harderwijk, Haarlem, the Malay Archipelago and Leiden shows that retrospectively defined categories such as 'naturalist', 'botanist', 'chemist', 'zoologist', 'geologist', 'mineralogist', 'administrator', and 'collector' are too rigid to convey the sense of political, economic and intellectual developments in the Netherlands and its colonial possessions in the Malay Archipelago in the late eighteenth and early nineteenth centuries. Reinwardt was a rather hybrid figure who, owing to political unrest, was continuously forced to look for new ways to pursue his career. In particular, his practical training as chemist and apothecary assistant in Amsterdam helped him cope with difficult political and economic circumstances.

By following Reinwardt to Amsterdam the first chapter of this study seeks to reconstruct the social, political and professional milieu in which Reinwardt trained and socialized. The chapter will show that it was manufacturers of chemicals and apothecaries in Amsterdam, especially, who sparked the introduction of innovative chemical practices in order to compensate for the dwindling delivery of raw material from the colonies in the East and West Indies in the aftermath of the Fourth Anglo-Dutch War

(1780-84). Many of them considered chemistry part of a larger 'oeconomic' discipline. One of their primary achievements was securing the widespread application of exact measuring devices such as aerometers, barometers, thermometers, and balances in different useful contexts. These devices allowed them to standardize and improve the production of various medical drugs and chemicals in their small laboratories. During his years as apprentice in Amsterdam, Reinwardt thus gained a deeper understanding of how measurement, standardization, and analytic reasoning could function as core tools for enhancing the efficiency of small enterprises in particular and society in general.

The second chapter situates Reinwardt in the small town of Harderwijk in the province Gelderland in the years after the Batavian Revolution in 1795. Although Reinwardt held neither a pharmaceutical nor an academic diploma, the Batavian administrators appointed the former chemist-apothecary as university professor for chemistry, natural history and herbology. His appointment shows that his practical chemical training also qualified him for his duties as an academic teacher. While at Harderwijk, Reinwardt got involved in various 'provincial committees' being set up by the Batavian administrators to improve the province's agriculture and medical education. These committees and his position at the university served Reinwardt as important platform to fashion himself as a 'useful' university professor *and* able administrator who know how improve the economic exploitation of the province of Gelderland.

As the third chapter shows, Reinwardt continued his career as useful academic *and* administrator first in Haarlem and later Amsterdam under the regime of Louis Napoleon. During his years as director of a new royal garden and cabinet in Haarlem, Reinwardt intensified his contacts with the Dutch Society of Sciences (Hollandsche Maatschappij van Wetenschappen) and Teyler's Second Society (Teyler's Tweede Genootschap). Both societies formed important nodal points in the country's scientific geography. In particular, through his friendship with the physician Martinus van Marum (1750-1837), since 1794 secretary of the Dutch Society, Reinwardt gained access to an influential network of wealthy amateurs and learned men. During his years in Amsterdam, where he received a professorship for chemistry, natural history and herbology in 1810, Reinwardt used his new social status to refashion and present himself as a travelling, measuring and observing naturalist. In contradiction to other experts naturalists who focused almost exclusively on collecting, describing and naming plants, animals and minerals, Reinwardt now stressed the importance of field

observations and measurable environmental factors such as temperature, soil quality, altitude and humidity, all of which influenced the growth and productivity of plants. For only by travelling and measuring these environmental features would allow one to unravel the underlying forces of nature which shaped and continued to shape the vegetation of a certain area. The chapter thus shows that Reinwardt's proto-ecological vision of nature, which historians have labelled 'humboldtian' and 'encyclopaedic', was firmly rooted in a political climate in which the improvement of agriculture, economy and society played a decisive role.[28]

The fourth and fifth chapters follow Reinwardt to Java in the Malay Archipelago, where he stayed from 1816 to 1822 as advisor to a General Committee (*commissie generaal*). The Committee had been tasked with taking over the Netherlands Indies from the British and setting up a functioning colonial administration. As a high colonial civil servant, he was entitled to travel through large parts of the Malay Archipelago. As he did in the Netherlands, Reinwardt had a hybrid identity in the Dutch colony: on the one hand, he was involved in the establishment of a colonial state and on the other hand he was obliged to carry out a variety of natural historical investigations. As an advisor to the colonial government, he became involved in the improvement of the educational system, medical supervision, agriculture, and economic botany. Both chapters show that Reinwardt depended upon the colonial infrastructure as well as on the skills and knowledge of a broad array of local helpers.

The last chapter focuses on Reinwardt's early years as professor of natural history, botany, and chemistry in Leiden. Like travellers such as Von Humboldt, Reinwardt insisted on the primacy of his encounter with nature and people in the Malay Archipelago and presented himself as an heroic figure who had faced and mastered the perils of travelling through untamed and dangerous places. At the same time, his retrospective reconstructions of these encounters tended to de-emphasize or even erase the various local interactions and mediations on which the accumulation of knowledge in the field depended. At the same time, Reinwardt tried to use his alleged authority and status as travelling and intrepid naturalist *and* able administrator to challenge his sedentary colleagues in Leiden by announcing a 'new' natural history that should draw exclusively upon field research and

[28] For the application of the labels 'humboldtian' and 'encyclopedic' to Reinwardt, see, for instance, W. Otterspeer, *Groepsportret met de dame,* vol. 3, *De werken van de wetenschap. De Leidse Universiteit, 1776-1876* (Amsterdam: Bert Bakker, 2005), 274-75.

measurement. With his travel account on the Malay Archipelago Reinwardt aimed at contributing to a proto-ecological 'physical description' of the earth (*physikalische aardbeschrijving*) as cameralists, administrators, and travellers such as Johan Georg Adam Forster (1754-1794), José Celestino Mutis (1732-1808), and Von Humboldt had put forward in their writings. In the end, however, Reinwardt's travel account was never published. Owing to the rising costs of administering the colonies in the East, the king and his ministers eventually lost confidence in Reinwardt, who continuously praised the benefits of his investigations for colonial agriculture and trade. Instead of sponsoring the publication of Reinwardt's travel account, the king decided to erect a new National Museum of Natural History and a National Herbarium. The directors of both institutions – Reinwardt was passed over for these posts – received funding to enrich their collections and to initiate illustrated publications on the 'natural history' of the Dutch overseas possessions.

Taken together the six chapters shed light on the overlap between the realms of science, governance and empire in the Netherlands and its colonial possession in the decades around 1800. Seen through the lens of Reinwardt's career, this study shows that 'chemistry' functioned as an important link between these various domains. Owing to their practical education in the fields of chemistry, botany and efficient management of small companies, chemist-apothecaries such as Reinwardt could easily switch between the realms of agriculture, the processing industries, museums, botanical gardens, and state administration. In particular their claim that they were able to measure and harness the 'forces of nature', such as wind, water, fire and air for various useful ends made a deep impression on governments and rulers that ruled the Netherlands in the late eighteenth and early nineteenth centuries.

PART I

Amsterdam,
Harderwijk, Haarlem

1

Learning About Nature

Who after this excellent attempt of Lavoisier, wants to reprimand me that I distinguish the new chemistry from the old one, and [that] I consider her the best interpreter of nature and the most excellent helper of human industry? For which product of nature exists which she cannot elucidate, which human industry [exists] which she cannot improve?

Reinwardt in a lecture on the benefits of the 'new chemistry' for Dutch science and industry held in Harderwijk in 1805.[1]

Caspar Georg Carl Reinwardt was born in Lüttringhausen in the kingdom of Prussia in June 1773. After the early death of his father Johann Georg, a student of the German poet Christian Fürchtegott Gellert (1715-1769), his mother Catherina Goldenberg and his uncle Melchior took care of the boy's upbringing. In 1787, at the age of fifteen, Reinwardt moved to be with his older brother, Johann Christian Mattheus (*-1811), who worked as apothecary and chemist in Amsterdam.[2] At that time, the city numbered around 200.000 inhabitants.[3]

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[1] C.G.C. Reinwardt, "Redevoering over de voortreffelijkheid der nieuwe scheikunde boven de oude in het verklaaren der verschijnselen der natuur en kunst," *Vaderlandsch magazijn van wetenschap, kunst en smaak* (1805), 198: "Wie zal, na deze uitmuntende poogingen van Lavoisier, mijn nog berispen, dat ik de nieuwe Scheikunde onderscheiden van de oude, en de beste uitlegster der natuur, en de voortreffelijkste helpster der menschelijke kunsten genoemd heb? Want welk gewrocht der natuur is 'er, 't welk zij niet verklaaren, welke menschelijke kunst, welke zij niet bevorderen kan?"

[2] SA Amsterdam, 27: Archief van het collegium medicum, collegium obstetricium en plaatselijke commissie van geneeskundig toevoorzicht, inv. 19 and 23. Reinwardt's

After some initial doubts and deliberations with his family in Lüttringhausen, the young Reinwardt decided to prolong his stay and work as assistant at his brother's chemical workshop on the Lauriergracht, which Johann Christian ran together with his companion J.C. Sleesen.[4] Reinwardt himself later summarized his relationship with his brother, who died young, to an Amsterdam professor of natural history and chemistry as follows:

> Everything which I have achieved is due to the companionship, the example and the advice of my tenderly beloved brother—a pleasure which has been preserved until this very day. Fostering a strong interest in all sciences [*omnium litterarum*], he made me strive for the same goal and to compete with him. You, highly esteemed Sir, know how thoroughly he understands his profession, and in particular chemistry.[5]

Reinwardt's self-description as an ambitious and highly motivated 'scientist'—the term 'scientist' is here used in the more encompassing sense of the German term *Wissenschaftler*—needs some explanation. None of Reinwardt's previous biographers has scrutinized this rather idealized self-image which the naturalist sketched of his apprenticeship. The following chapter offers an in-depth reconstruction of the milieu in which Reinwardt was socialized and trained. [6]

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brother started an apprenticeship in October 1782 under the apothecary Jacobus Luckemeyer.

[3] H.A. Diederiks, *Een stad in verval. Amsterdam omstreeks 1800. Demografisch, economisch, ruimtelijk* (Rotterdam: Krips Repro Meppel, 1982), 145.

[4] Unfortunately the workshop is not mentioned in the detailed survey of Amsterdam's processing industry by L. van Nierop, "Gegevens over de nijverheid van Amsterdam bijeengelezen uit de advertenties in de Amsterdamsche Courant," *Jaarboek van het Genootschap Amstelodamum* 28 (1931): 95-170; and *Ibidem*, 29 (1932): 253-310.

[5] Parts of the original Latin letter are reprinted in De Vriese, *Reinwardt's reis,* 6, footnote 1. Reinwardt to G. Vrolik, circa 1800: "Hujus fratris, carissimi mortalium, consuetudini, exemplo, consiliis, quibus in hunc usque diem usus sum, omnia debeo et accepta refero. Namque ut fuit omnium litterarum semper studiosissimus, ita et me sui imitatorem aemulumque fecit. Neque tu ignoras, vir ornatissime, quam sit suae artis, chemicaeque imprimis peritissimus."

[6] For earlier biographies of Reinwardt see: T.W. van Heiningen, *The correspondence of Caspar Georg Carl Reinwardt (1773-1854)*, vol. 1: 1802-1819 (The Hague: Dutch – History of Science – Web Centre, 2011), 13-37; T.W. van Heiningen, "Caspar Georg

By focusing on the realm of chemists and apothecaries in Amsterdam in the late eighteenth century, the chapter also offers a fresh picture of Amsterdam's pharmaceutical and chemical industry in the second half of the eighteenth century.[7] While economic historians have focused their analysis on the economic stagnation of the Low Countries in general and the staple market in Amsterdam in particular,[8] the following chapter uncovers a dynamic community of merchants, academically schooled physicians, manufacturers of chemicals, and apothecaries that provided fertile ground for the innovative chemical practices necessary for the efficient processing of raw material and the production of drugs and chemicals on a larger scale.[9]

The subsequent analysis of the material world and practices of chemists, apothecaries and producers of chemicals in Amsterdam in the late eighteenth century also supports the view, as expressed by historians of chemistry, that there were hardly any borders between the different professional realms in the field.[10] Similarly in Germany and France, chemistry and pharmaceutical art appeared as closely intertwined

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Carl Reinwardt. Wissenschaftliche Aktivitäten im Dienste des ostindischen Gouvernements," in *Medizingeschichte in Schlaglichtern. Beiträge des "Rheinischen Kreises der Medizinhistoriker"*, ed. Dominik Groß et al., 179-91 (Kassel: Kassel University Press, 2011); W.H. de Vriese, "Reinwardt's leven en werken, eene bijdrage tot de geschiedenis der natuurkundige wetenschappen, inzonderheid in betrekking tot Nederlandsch Oost-Indië, en als inleiding tot de uitgave zijner reize naar de Ooster-eilanden van den Indischen archipel," in *Reis naar het oostelijk gedeelte van den Indischen Archipel, in het jaar 1821*, ed. W.H. de Vriese and J. Pynappel (Amsterdam: Frederik Muller, 1858), 1-98; P.J. Veth, "C.G.C. Reinwardt," *Handelingen en geschriften van het Indisch genootschap te 's-Gravenhage* (1856): 185-225; and W. Vrolik, "Levensberigt van C.G.C. Reinwardt," *Verslagen en mededeelingen van de Koninklijke Akademie van Wetenschappen* (1854): 214-31.

[7] For a similar view, see K. Davids, "Shifts of technological leadership in early modern Europe," in *A miracle mirrored. The Dutch Republic in European perspective*, ed. Karel Davids, et al. (Cambridge: Cambridge University Press, 1995), 358.

[8] See for instance J.L. van Zanden and A. van Riel, *Nederland 1780-1914. Staat, instituties en economische ontwikkeling* (Amsterdam: Balans, 2000), 27-70.

[9] A similar view is expressed in J. Jonker, *Merchants, bankers, middlemen. The Amsterdam money market during the first half of the 19th century* (Amsterdam: Neha, 1996), 77-8.

[10] U. Klein, "Die technowissenschaftlichen Laboratorien der frühen Neuzeit," *NTM. Zeitschrift für Geschichte der Wissenschaften, Technik und Medizin* 16:1 (2008): 5-38; U. Klein and W. Lefèvre, *Materials in eighteenth-century science. A historical ontology* (Cambridge: MIT Press, 2007), 33-37.

endeavors.[11] Chemistry in the late eighteenth century was, as Jan Golinski, a historian of chemistry, puts it, "a discipline without rigid boundaries."[12]

During his years as chemist in Amsterdam, Reinwardt laid the basis for his later career as professor, administrator, and colonial advisor. Later chapters will show how chemists such as Reinwardt, who were thought to know how to survey and manipulate nature for medicinal and other useful ends, found their way through the complex political and social landscape of the Netherlands in the decades around 1800.[13]

Apprentice at a Chemical Workshop

Owing to the lack of archival records it remains unclear when exactly Reinwardt's assistantship at his brother's chemical workshop started. Since the requirements for apothecary apprentices were demanding—beside a minimum age of sixteen, apprentices had to dispose of a sufficient knowledge of Latin and Dutch[14]—it seems that Johann Christian Mattheus managed to employ his younger brother first as 'servant' *(knegt)* at his chemical workshop on the Lauriergracht. In contrast to regular apothecaries, such workshops usually produced chemicals for both medicinal and various industrial purposes. Their preparations thus ranged from all kinds of medicinal drugs to chemicals for Amsterdam's textile, glass, sugar, porcelain, paper, soap, metal and dying industries.[15] Among the more important chemicals were

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[11] U. Klein, "Apothecary's shops, laboratories and chemical manufacture in eighteenth-century Germany," in *The mindful hand: inquiry and invention from the late Renaissance to early industrialization,* ed. Lissa Roberts, et al., 247-76 (Amsterdam: Edita, 2007).

[12] J. Golinski, "Chemistry," in *Cambridge History of Science*, vol. 4, *Eighteenth-century science,* ed. R. Porter (Cambridge: Cambridge University Press, 2003), 376.

[13] For an inspiring overview of similar careers and reflections on general patterns see A. Maas, "Civil scientists: Dutch scientists between 1750 and 1875," *History of Science* 48:1 (2010): 75-103.

[14] On the training of apothecaries in the Dutch Republic in general and Amsterdam in particular see E.L. Ahlrichs, "Van leerjongen tot meester-apotheker VII," *Pharmaceutisch weekblad* 116:45 (1981): 1369-73.

[15] For an overview of Amsterdam's industry in those years, see J. Goldberg, "Journaal der reize van den agent van Nationale Oeconomie der Bataafsche Republiek, a. 1800," *Tijdschrift voor staathuishoudkunde en statistiek* 19 (1860): 185-86; H. Diederiks, *Een stad in verval*, 152-4, 161-5, 174-83 and 198-200, who discusses various branches. As regards sugar refineries see also M.S.C. Bakker, "Suiker," in *Geschiedenis van de techniek in Nederland. De wording van een moderne samenleving 1800-1900*, vol. 1, *Techniek en*

borax, camphor and saltpeter. While borax and camphor were used in the glass and porcelain production, saltpeter was a key ingredient in fertilizers and gunpowder.

A survey carried out in 1799 and 1800 by the Minister for National Oeconomy (Agent van Nationale Oeconomie), Johannes Goldberg (1763-1828), gives good insight into Amsterdam's chemical industry.[16] According to Goldberg, Amsterdam housed four borax, four camphor, three saltpetre, three sulphur and fifty-nine sugar refineries as well as two alcohol (*sterkwater*), five vermillion and two salt factories.[17]

When Reinwardt started his assistantship in 1786, the number of chemical factories in Amsterdam was dwindling. A major reason for this decline was the Fourth Anglo-Dutch War in which the Dutch East India Company lost many of its ships and thus access to colonial possessions in India and the Malay Archipelago.[18] The sugar and camphor industry—the so-called traffics (*trafieken*)—in particular depended heavily on cheap raw materials from overseas territories.[19] As regards the sugar refineries, Goldberg noted in his survey that the number of companies declined from 120 refineries before the war to 59 in the late 1790s. The difficulties associated with the war were aggravated by rising competition within Europe. Administrators and chemists in France, Britain, Russia, Denmark, Norway and Sweden had stimulated the establishment of new chemical companies and succeeded in introducing new and efficient refining processes in the second half of the eighteenth century. In order to protect domestic markets, they even started to raise high import tariffs on refined sugar from abroad.

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modernisering. Landbouw en voeding, ed. H.W. Lintsen, (Zutphen: Walburg Pers, 1992), 217-18.

[16] K. Davids, *The rise and decline of Dutch technological leadership*. *Technology, economy and culture in the Netherlands, 1350-1800* (Brill: Leiden, 2008), 2.473-74. For more background information on the Goldberg survey see A.M. van der Woude, "Ontstaan en plaatsbepaling van de Goldberg-enquête," *Economisch en sociaal-historisch jaarboek* 55 (1992): 15-28.

[17] NA The Hague, collectie Goldberg, inv. 50 II, fol. 453-66.

[18] F. Gaastra, *De geschiedenis van de VOC* (Zutphen: Walburg Pers, 2002), 166-70 and E.S. van Eyck van Hesling, *Van compagnie naar koopvaardij. De scheepvaartverbinding van de Bataafse Republiek met de koloniën in Azië 1795-1806* (Amsterdam: De Bataafsche Leeuw, 1988), 17′-36.

[19] J. Mokyr, *Industrialization in the Low Countries, 1795-1850* (New Haven: Yale University Press, 1976), 2-3, and J. de Vries and A. van der Woude, *The first modern economy. Success, failure, and perseverance of the Dutch economy, 1500-1815* (Cambridge: Cambridge University Press, 1997), 328.

According to Goldberg, Britain also subsidized the export of sugar to other European countries. [20]

Figure 3: Portrait of Caspar Georg Carl Reinwardt
by Mattheus I. van Bree and R. Vinkeles
(around 1800).

The fate of the company of Theodorus Petrus Schonck (1736-1812) and his successor Anthoni d'Ailly (1766-1825) gives good insight into the material world of chemists and apothecaries in Amsterdam at the time.[21] Schonck and his companion D'Ailly processed and produced saltpeter, borax, camphor and alcohol for various industrial and medicinal purposes.[22] Reinwardt must have become acquainted with Schonk and D'Ailly in starting in the 1790s, for in April 1801, he acted as godfather to D'Ailly's daughter Caroline Elisabeth.[23] In his botanical diary, he mentions earlier

[20] NA The Hague, collectie Goldberg, inv. 50 II, fol. 459.
[21] D.A. Wittop Koning, "Bijdragen tot the pharmaceutische prijsgeschiedenis", *Kring voor de geschiedenis van de pharmacie in Benelux* 17 (1958): 11-12.
[22] D.A. Wittop Koning, *Compendium voor de geschiedenis van de pharmacie van Nederland* (Lochem: De Tijdstroom, 1986), 90.
[23] SA Amsterdam, doopregister (1564-1811), 113, p. 574 (fol. 275), no. 15.

visits of Schonck's and D'Ailly's company.[24] In 1776, Schonck had moved his small laboratory from the Haarlemmerdijk to the Zaagmolenpoort in Amsterdam, where various small manufactures and companies had settled in the course of the seventeenth and eighteenth century.[25] At this new venue, Schonck set up a small laboratory with a furnace and distilling apparatuses that allowed him to produce chemicals on a larger scale. Apparently, the company also owned a collection of living animals whose excrement was necessary for various chemical preparations.[26]

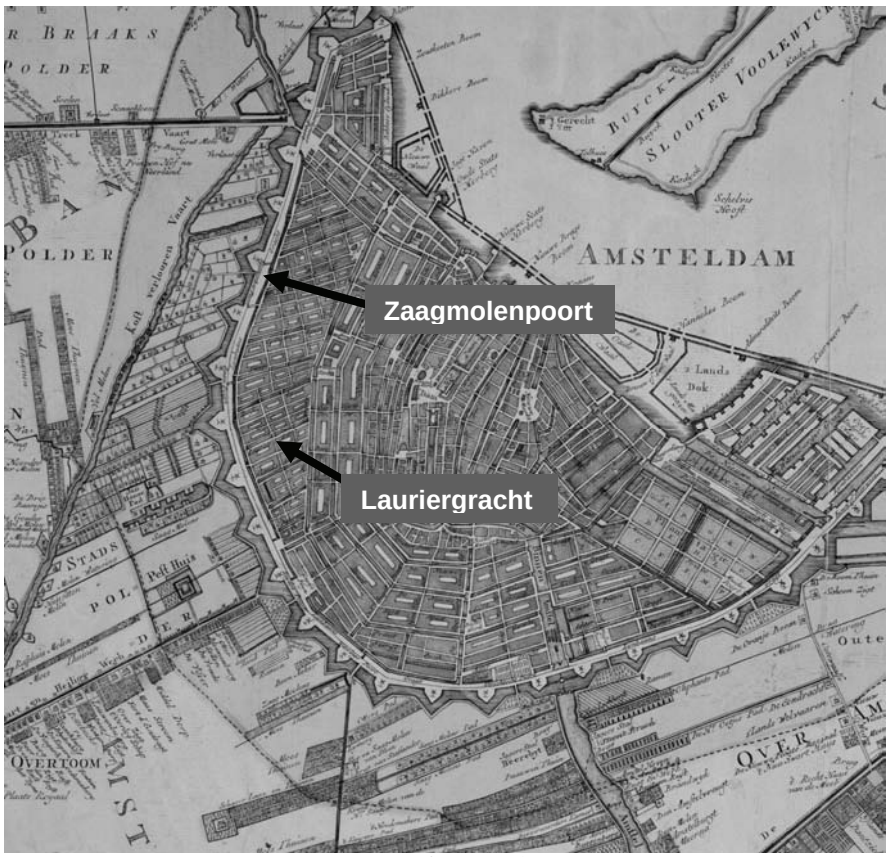

Figure 4: Map of Amsterdam, 1770.

[24] See, for instance, UL Leiden, BPL 611, botanical diary, entries: 25 and 26 November 1797.

[25] NA The Hague, collectie Goldberg, inv. 50 II, fol. 453-66.

[26] J.A. Bierens de Haan, *De Hollandsche Maatschappij der Wetenschappen 1752-1952* (Haarlem: H.D. Tjeenk Willink & Zoon N.V., 1970), 257.

Instead of following the curriculum of regular apothecary apprentices, chemist-apothecaries like Reinwardt learned their trade through daily practice in the small laboratories of the chemical workshops. His training involved a large array of raw materials, long-term experimentation and regular practice with various instruments. According to descriptions that Goldberg compiled in the late 1790s, the processing of alcohol, camphor, sal ammoniac, sugar and borax involved raw materials such as saltpetre, vitriol, iron vitriol, raw camphor from Japan, raw borax, chalk, egg white, fish glue, soda water, butter, oxblood, pipe clay from Cologne, milk, fat, bones (*beenderen*), urine, soot (*roet*), *wollen vod* and strong sulphuric acids. Moreover, it involved a variety of tools and instruments such as different forms of furnaces, distilling jars, retorts and receivers (*ontvangers*), sublimation glasses, bins, bowls, copper kettles, crystallization barrels (*cristallizeervaten*), skimmers, a filter machine (*defiltreermachine*), thermometers, balances, a copper kettle in a cold store, and special kettles for evaporation.[27]

According to Goldberg's descriptions, camphor usually reached Amsterdam in the form of little balls which were pressed in big barrels. The balls had been produced in Japan, Ceylon, Borneo and Java by soaking and cooking the leaves, branches, wood, roots and the bark of camphor trees. Since the camphor balls were rather impure, they had to be further purified by sublimation which was first done by chemists in Venice but was now carried out directly in Amsterdam. Goldberg described the sublimation process as follows: first, the raw camphor balls were sieved in order to remove crude impurities. After that, the camphor was mixed with chalk and placed in spherical sublimation bulbs which were narrowed at their neck and at the bottom. The opening of those bulbs was sealed with cotton and hot sand. In order to start the sublimation, the bulbs were carefully heated until the camphor dispersed as dehydrated oil. Thereafter the heat had to be decreased and the hot sand at the top of the bulbs was replaced by a cap (*muts*) made of cardboard through which the camphor could evaporate and settle in the upper and colder parts of the bulb. Finally, the bulb could be broken and the purified camphor which was now in the form of a large *bollekoek* (thick cake) could be taken out. Beside sublimation camphor could also be purified by dissolving the camphor balls in wine spirit (*wijngeest*) and filtered by precipitating the camphor with water. The outcome had to be poured into

[27] The descriptions can be found in NA The Hague, collectie Goldberg, inv. 45.

spherical bulbs and carefully heated and then cooled down to let the camphor harden.[28]

Usually chemists such as Schonck and D'Ailly did not employ more than ten servants (*knegts*). Such companies were not attached to guilds, which usually regulated the education of apprentices. It is therefore not surprising that Reinwardt does not appear as an apprentice in the archives of the Amsterdam *collegium medicum* which was responsible for the examination and supervision of apothecaries and surgeons. The records only list his brother Johann Mattheus who apprenticed with the Amsterdam apothecary Jacobus Luckemeyer from 1782 until 1785.[29]

Figure 5: View on the distillery (*stoockhuys*) of the chemical workshop of Anthoni d'Ailly (1766-1825).

[28] NA The Hague, collectie Goldberg, 45, on camphor refineries.

[29] SA Amsterdam, 27: Archief van het collegium medicum, collegium obstetricium en plaatselijke commissie van geneeskundig toevoorzicht, inv. 19 and 23.

The Chemical Education of Apothecaries

When Reinwardt started his assistantship in the late 1780s, new ideas about how chemistry should be practiced played a growing role in the professional life of chemists and apothecaries in Amsterdam and throughout the Low Countries.[30] While on a provincial level reform societies such as the Provincial Utrecht Society of Arts and Sciences (Provinciaal Utrechtsch Genootschap van Kunsten en Wetenschappen), the Society for the Improvement of Agriculture (Maatschappij tot de Bevordering van de Landbouw), the Society for the Benefit of the People (Maatschappij tot Nut van 't Algemeen) and the Economic Branch of the Dutch Society of Science (Oeconomische tak van de Hollandsche Maatschappij der Wetenschappen) promoted chemical knowledge as a general tool to mitigate the relative economic decline of the Dutch Republic,[31] Amsterdam's chemists rather stressed the importance of a thorough chemical education in order protect their profession from untrained and unexamined practitioners who, as the Amsterdam chemist and apothecary Johannes Petrus Kasteleyn (1746-1794) and his colleague Schonck put it, fabricated and sold drugs and other chemicals without having been carefully trained and examined.[32] In an answer to an essay competition of the Utrecht Learned Society in 1785, Kasteleyn and Schonck summarized the situation in Amsterdam as follows:

> It is *Amsterdam*, the mighty, the populated *Amsterdam*, where in the shops of the *chymisten,* apothecaries [*drogistenwinkels*] and herbal shops, and who knows where else, one daily can witness how hundreds of drugs prescribed by physicians are prepared without any punishment. It is particularly *Amsterdam* where one can find all sorts of pernicious so-called drugs fabricated by entirely inexperienced [practitioners] who, year after year, offer their drugs in public. . . . It is in *Amsterdam* where around 150

[30] Regarding apothecaries in Rotterdam see M.J. van Lieburg, *Het medisch onderwijs te Rotterdam (1467-1967). Een kort historisch overzicht* (Radopi: Amsterdam, 1978), 56-7.

[31] See W.W. Mijnhardt, *Tot heil van 't menschdom. Culturele genootschappen in Nederland, 1750-1850* (Amsterdam: Radopi, 1987), chapter 3, and G.P.J. Verbong, "De uitgangssituatie," in *Geschiedenis van de Techniek in Nederland. De wording van een moderne samenleving, 1800-1900,* vol. 5, *Techniek, beroep en praktijk,* ed. H.W. Lintsen, et al. (Zutphen: Walburg Pers, 1994), 36-45.

[32] For a detailed study on Kasteleyn see L. Roberts, "P.J. Kasteleyn and the "Oeconomics" of Dutch chemistry," *Ambix* 53:3 (2006): 255-72.

> apothecaries are trying . . . pretending to be medical doctors in order to secure their living in a quacksalvering way . . . . Look at the disastrous situation of pharmacy, in the most powerful, most populated city of our Union.[33]

According to the two apothecaries, two measures had to be taken in order to improve the situation in the Dutch Republic in general and in Amsterdam in particular: first, the city council had to take care that all new chemists and apothecaries were carefully chosen and examined. Second, every apothecary in the country should have the opportunity for special training in the field of pharmaceutical chemistry as it was practiced in Germany.[34]

In Germany, similar claims about apothecaries had led to the establishment of special institutes for pharmacy and chemistry which were supposed to train apothecaries and manufacturers. The first institute was set up in Langensalza in the north of Thuringia by the apothecary Johann Christian Wiegleb (1732-1800) in 1778. Wieglieb's Educative Institute for Young Chemists (Erziehungsanstalt für junge Scheidekünstler) rapidly attracted young apothecaries and manufacturers from all parts of the German empire, England, Switzerland, Denmark, Poland, Prussia, Hannover and Württemberg. Wiegleb's institute was innovative in two respects: on the one hand Wiegleb taught classes on chemistry and pharmacy in which he demonstrated the practical application of various chemical substances and instruments such as thermometers and balances. On the other hand, instead of focusing only on medicinal drugs produced for a tiny market he instructed

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[33] T.P. Schonk and J.P. Kasteleyn, "Tweede antwoord op de vraag…", *Verhandelingen van het Provinciaal Genootschap van Kunsten en Wetenschappen* 4 (1786): 176-77: "'t is Amsterdam, het magtig, het volkrijk Amsterdam, waar men in Chymistenwinkels, Drogistwinkels, Kruidenwinkels, en wie weet waar niet al meer, dagelijksch eenige honderde Ordonnantiën door Doctoren voorgeschreeven, ongestraft durft en ziet gereed maaken. 't Is Amsterdam vooral, waar men allerhande verdervelijke zogenaamde geneesmiddelen door volkoomen onkundigen, in de openbaare nieuwsmaaren, jaar uit, jaar in, openbaar, te koop veilt. . . . 't Is Amsterdam, waar een aantal van 150 Apothekers zich vermoeijen, . . . met den Doctor uithangen, ten einde op eene zekere kwakzalverachtige wijze hun bestaan te vinden. . . . Zie daar, den rampzaligen toestand der Pharmazie, in de magtigste, de volkrijkste Stad onzer Unie."

[34] Ibidem, 164.

his disciples in how to prepare chemical products such as soap and mineral alkalis on a larger scale.[35]

The success of Wiegleb's approach led to the establishment of similar schools in Berlin, Hamburg, Kassel, Naumburg and other places in Germany. One of the most important foundations was the pharmaceutical school (Chemisch-physikalisch-pharmeceutische Pensionsanstalt) of the chemist Johann Bartholomäus Trommsdorff (1770-1837) in Erfurt in 1795.[36] In contrast to Wiegleb, Trommsdorff gave classes not only in analytical chemistry but also in botany, zoology, mineralogy and herbology. Moreover, Trommsdorff started publishing a new chemical journal, *Journal der Pharmacie,* which he used as a platform to spread information about innovative chemical techniques and new chemical instruments. Trommsdorff trained more than 300 apprentices and he later got engaged in the large-scale production of soda and indigo.[37]

In order to follow the German example, Kasteleyn and Schonck called for the appointment of public lecturers for chemistry in six or, better still, eight major cities in the Republic who would teach the basic principles of chemistry in Dutch. For, as the two chemists put it,

> There is not a single branch of the traffics or workshop which is not indebted to chemistry; and which, if it is to flourish, has to be managed according to chemical principles, for almost all their manufacturing processes [*bewerkingen*] are chemical processes.[38]

Those lecturers had to be carefully chosen and examined in advance to guarantee the quality of their courses and lectures. Moreover, every lecturer

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[35] E. Homburg, *Van beroep 'Chemiker'. De opkomst van de industriële chemicus en het polytechnische onderwijs in Duitsland (1790-1850)* (Delft: Delftse Universitaire Press, 1993), 103-104.

[36] E. Homburg, "Industrie, chemie en milieu (1750-1815)," in *Geschiedenis van de techniek in Nederland. De wording van een moderne samenleving*, vol. 4, *Delftstoffen, machine- en scheepsbouw. Stoom. Chemie. Telegrafie en telefonie* (Zutphen: Walburg Pers, 1993), 162.

[37] Homburg, *Van beroep* 'Chemiker', 105, and H.R. Abe, W. Goetz, and H. Bettin, *Der Briefwechsel von Johann Bartholomäus Tromsdorff (1770-1837)* (Halle, Saale: Deutsche Akademie der Naturforscher Leopoldina, 1987), 8-9.

[38] Schonk and Kasteleyn, "Tweede antwoord op de vraag…", 142: "Er is niet eenige Trafiek, of Fabriek, welke niet haaren oorsprong aan de Scheikunde verschuldigd is; en die, zal zij bloeijen, volgens Scheikundige grondregelen, moet bestuurd worden; dewijl verre de meeste dier bewerkingen Scheikundige bewerkingen zijn."

should receive a well equipped laboratory in order to demonstrate and explain the chemical techniques and instruments which were necessary to improve the production of drugs and industrial chemicals. These instruments and techniques would also enable the identification of adulterated substances produced by untrained practitioners.[39] Amsterdam's *collegium medicum* regularly had to deal with cases in which 'unauthorized' practitioners were accused of counterfeiting drugs.[40]

In the years to come, Kasteleyn in particular never tired of admonishing colleagues and administrators to improve the chemical education in order to improve public health care and to stimulate economic growth. He repeatedly stressed the importance of combining theory and practice.[41] From 1785 on, he published the journal *Chemische oefeningen* (Chemical exercises) dedicated to the application of chemistry for manufacturers and apothecaries. Beside lecturing and giving papers, he also edited a series of books that described how industrial processes such as the dying of textiles with indigo, distilling of alcohol and the manufacturing of porcelain could be improved. The books that came off the press in Dordrecht between 1788 and 1792 were mainly translations of German and French titles.[42] In his *Beschouwende en werkende pharmaceutische-, oeconomische- en natuurkundige chimie* (Theoretical and practical pharmaceutical, oeconomic and physical chemistry), which appeared between 1786 and 1794, Kasteleyn tried to give a concise overview of the available useful chemical techniques and practices in various industrial contexts such as soap manufacturing and alcohol production.[43]

Similar ideas were echoed in other Dutch cities. Petrus Driessen (1753-1828), since 1778 lecturer in chemistry, pharmacy and *materia medica* in Groningen, proposed comparable reforms for the training of future apothecaries and manufacturers. Driessen taught various classes on industrial processing (*fabriekkunde*) and 'oeconomic' and technological chemistry.

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[39] Ibidem, 181.

[40] J.J. Haver Droeze, *Het collegium medicum Amstelaedamense, 1637-1798* (Haarlem, 1921), 151-52.

[41] For a detailed analysis of Kasteleyn's work see Roberts, "P.J. Kasteleyn and the "Oeconomics," 255-72.

[42] The full title of this series of monographs is: *Volledige beschrijving van alle konsten, ambachten, handwerken, fabrieken, trafieken, derzelver werkhuizen, enz.* (Entire description of all arts, trades, crafts, fabrics, industries and their working places, tools, etc.).

[43] P.J. Kasteleyn, *Beschouwende en werkende pharmaceutische, oeconomische, en natuurkundige chemie*, 3 vols. (Amsterdam: Willem Holtrop, 1786-1794).

Together with his students he regularly visited manufactures and industries in the environs of Groningen to gain insight into pressing technical problems. By doing so, his students received a unique training in which theoretical insights and practical expertise were narrowly intertwined.[44] In Delft, Abraham van Stipriaan Luiscius (1763-1829) was appointed public lecturer for chemistry in 1790, and commenced his new position with a lecture on the general usefulness of chemistry and its relationship with medicine.[45] Other cities followed. In Haarlem, Martinus van Marum was appointed as lecturer of botany and chemistry in 1795. One year later, Nicolaas Cornelis de Frémery (1770-1844) was appointed teacher for chemistry and pharmacy in Utrecht. In Rotterdam, the physician and chemist Willem Rouppe (1765-1816) started lecturing in chemistry for the Batavian Society for Experimental Philosophy (Bataafsch Genootschap der Proefondervindelijke Wijsbegeerte).[46] In Dordrecht and The Hague, Willem van der Leeuw (1763-1801) and Florentius Jacobus van Maanen (1777-1861) were later employed in similar positions.[47]

Weak Echoes of the *Collegium Medicum*

In Amsterdam, however, Kasteleyn's and Schonck's ideas remained disputed. In 1785, five wealthy Amsterdam merchants—J.J. van Hagen, J.H. Johansen, J. Joosten, J. van Etten and C. van Bevoord—approached the city council with a request to employ a public lecturer to improve the chemical expertise of manufacturers, chemists, and apothecaries. When asked for advice, the *collegium medicum* was rather sceptical about the initiative. In the opinion of the *collegium*'s board, chemistry formed part of the practical training of apothecary apprentices, which had to take place in apothecaries and not in a lecture hall. A public lecturer would only spread chemical knowledge among unskilled practitioners who in turn would compete with examined apothecaries in the city.[48]

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[44] Homburg, "Industrie, chemie en milieu (1750-1815)," 163.

[45] The full title of the lecture is: *Het nut der scheikunde in het algemeen en derzelver invloed op de Geneeskunde in het bijzonder.* On Luiscius, see Anonymous, "Levensberigt van den Heere A. Stipriaan Luiscius," *Algeemene Konst- en Letter-Bode* 22 (1829): 338-44 and 23 (1829): 354-59.

[46] On Rouppe see: Van Lieburg, *Het medisch onderwijs te Rotterdam*, 56-57.

[47] Homburg, "Industrie, chemie en milieu (1750-1815), " 163-4.

[48] W.P. Jorissen and L. Th. Reicher. *J.H. van `t Hoffs Amsterdamer periode: 1877-1895* (Helder: C. de Boer jr., 1912), 13.

Since the merchants offered to pay for the salary of the new lecturer, the city council eventually agreed to appoint the Amsterdam physician Dirk van Rhyn (1745-1817) as public lecturer for chemistry, pharmaceutics and *materia medica* at Amsterdam's university, the Athenaeum Illustre. Owing to the limited teaching facilities in the city, Van Rhyn's chemistry classes at the *hortus botanicus* remained on a rather basic level. In the academic year 1803/04, Van Rhyn even declined to continue his classes owing to the lack of a well-equipped laboratory. Only later did he manage to set up a very small and still inadequate chemical workplace at his house in the Staalstraat (De Saaihal).[49] It is doubtful whether Van Rhyn was allowed to use the chemical laboratory of the learned society *Felix Meritis* established in 1786 on the neighboring Keizersgracht.[50]

Amsterdam's chemists were also doubtful about Van Rhyn's teaching activities. In 1796, Schonck and his colleague Anthony Lauwerenburg (1758-1820), who had been asked by the city council to report on the state of chemists' education in Amsterdam and to develop an outline for a new laboratory, severely criticized Van Rhyn's approach. According to them, Van Rhyn considered chemistry only as an auxiliary science to medicine and thus would not demonstrate or explain useful chemical procedures and instruments. Schonck and Van Lauwerenburg put it as follows:

> The man who wants to enrich his skills, the inquisitive manufacturer, who is no longer satisfied with only passively watching phenomena which he encounters during his chemical preparations, but who wants to know the underlying reasons, the most important ingredients [*hoofdstoffe*], and the basic elements [*beginselen*] . . . of which the items [already] manufactured or to be manufactured consist, may find he has achieved his goal, if the various subjects of that discipline ['chemistry'] are being taught . . . and applied [in an industrial context]. It is something which many have longed for but which has never happened until now and we are fully convinced that those who have

[49] A.I. Bierman, *Van artsenijmengkunde naar artsenijbereidkunde. Ontwikkeling van de Nederlandse farmacie in de negentiende eeuw* (Amsterdam: Radopi, 1988), 178-79.

[50] W.P. Jorissen, "Iets over het onderwijs in de chemie aan het Athenaeum Illustre te Amsterdam voor de komst van J.W. Gunning," *Chemisch Weekblad* 27 (1911): 505.

> stimulated the establishment of such an institute will be praised after a few years. [51]

According to Schonck and Lauwerenburg, the new laboratory had to comprise basic instruments (*eenvoudige instrumenten*) which chemists used in their daily practice. Moreover, the new laboratory should provide enough space for a larger audience to attend classes and watch public demonstration of experiments. The classes had to be given by a lecturer trained in all facets of chemistry. If the number of students exceeded the maximum capacity of the new venue, the classes had to be divided into three different series: one for physicians, one for apothecaries and chemists and one for their apprentices. Since in particular chemists and apothecaries would probably be unable to read and understand Latin, the classes had to be held in Dutch. Moreover, the new lecturer had to base his classes on the ideas and practices which the French chemist Antoine-Laurent Lavoisier (1743-1794) and others had introduced into the field. Their approach, which Lavoisier eventually fixed in his famous text book, *Traité élémentaire de chimie* (1789), comprised two core features: on the one hand an extensive usage of thermometers, clocks, gasometres, and most important, balances in order to weigh, measure, split, and combine various natural elements such as gases and minerals, and on the other hand the introduction of a standardized chemical nomenclature to allow chemical treatments to be recorded and reproduced in a formalized manner.[52]

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[51] SA Amsterdam, 27: Archief van het collegium medicum, collegium obstetricium en plaatselijke commissie van geneeskundig toevoorzicht, inv. 6, fol. 30 and following folios. Letter Schonk and Lauwerenburg to city council, Amsterdam, 19 May 1796: "Den man die zijne kundigheden wenscht te vermeerderen, de weetgierige Fabrikeur, die zig niet langer wil vergenoegen de verschijnselen in bloot aanschouw te nemen, die hem in zijn scheikundige werkzaamheden voordoen, maar de redenen hiervan wil weten, de hoofdstoffe, de beginselen wil kennen, waaruit zijn, te vervaardigen of vervaardigde stoffe bestaan, kan zijn oogmerk bereikt zien, waneer in der onderscheidene vakken dier wetenschap geleeraard werd en deze op alle Fabrieken invloed heeft, werd toepasselijk gemaakt waarna helaas zo veelen jaren gereikhalst hebben, en nimmer tot heden hebben mogen zien gebeuren en wij houden ons ten vollen overtuigd dat na verloop van weinige jaren, en in zeegening zal gedagt worden, aan hen wien men die gelegenheid van zodanig instituut te danken heeft."

[52] Klein and Lefèvre, *Materials in eighteenth-century science*, 87-95, and Golinski, "Chemistry," 392-96, and B. Bensaude-Vincent, "Lavoisier: Eine wissenschaftliche Revolution, in *Elemente einer Wissenschaftsgeschichte*, ed. Michel Serres (Suhrkamp: Frankfurt am Main, 1995), 645-85.

In order to demonstrate and explain the usefulness of Lavoisier's chemistry, special classes on topics such as the manufacturing of metal, glass, paint and dye had to be held as well. Since the classes were supposed to have a rather practical character, the new laboratory should also comprise a cabinet where chemicals necessary for practical demonstrations could be stored.[53]

The answer of the *collegium medicum*, which at that time consisted of the Amsterdam professor of anatomy Andreas Bonn (1738-1817), the physicians F.E. Willet, Van Rhyn, and the apothecaries J. Frescarode and D.H. Post, gives further insights into the state of chemical education in Amsterdam at the time. Although the *collegium medicum* also emphasized the close relationship between chemistry and medicine, pharmacy and the processing industry, its members doubted whether the new laboratory should serve as a place where useful chemical practices for manufacturers and chemists ought to be taught. In their opinion, Amsterdam already housed a community of dynamic and innovative manufacturers who were encumbered by political turmoil rather than by a lack of chemical expertise. Moreover, learned societies such as the *Oeconomische Tak* stimulated the production of useful knowledge by launching essay competitions. Nor did physicians need a new laboratory. Since they had studied at the Athenaeum Illustre or even abroad, they possessed enough chemical expertise to carry out their profession properly. The only group which perhaps needed a better chemical training were the apothecaries and their apprentices.[54]

Instead of appointing a new lecturer, the *collegium medicum* proposed to employ Van Rhyn as head of the new laboratory. Moreover, they rejected the proposal to instruct the new lecturer in how the laboratory should be equipped and how chemistry should be taught. And instead of offering three courses, the *collegium medicum* suggested that Van Rhyn teach two courses: In the first course, to be taught in Dutch, the focus had to be on the practical application of chemistry in various technological contexts. A second course on the *chymia pharmaceutica* for physicians, apothecaries and their apprentices had to be based on the *Nieuwe Amsterdamsche Apotheek*

[53] SA Amsterdam, 27: Archief van het collegium medicum, collegium obstetricium en plaatselijke commissie van geneeskundig toevoorzicht, inv. 6, fol. 31-4. Schonk and Lauwerenburg to city council, Amsterdam, 19 May 1796.

[54] Ibidem, inv. 6, fol. 36-40. Consideratien en advies van het collegium medicum op het rapport van T.P. Schonk en A. Lauwerenburg wegens een laboratorium chemicum. Amsterdam, 6 July 1796.

(1795), the practical manual for apothecaries in the city compiled by the members of the *collegium medicum*.[55]

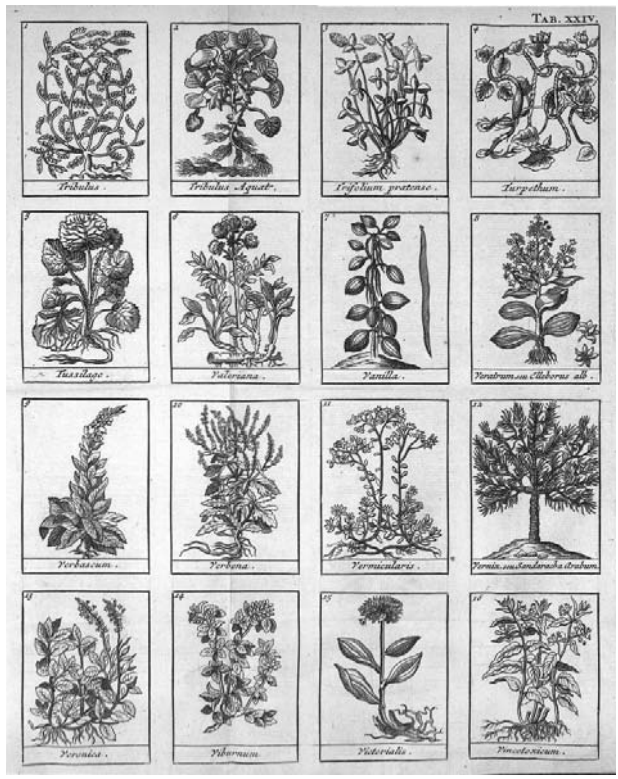

Figure 6: Illustration of medicinal plants in N. Lémery. *Dictionnaire ou traité universel des drogues simples*. Amsterdam 1716. Table XXIV.

The *Nieuwe Amsterdamsche Apotheek* contained an exact definition of weights, a list of all medicinal herbs and plants and practical information on topics such as syrups, various oils, extracts from resins, the distillation of liquids, oils and alcohols (*geesten*), saltpeter, simple preparations with chalk magnesia, salts such as potash, and sulphur, the preparation of metals, powders, pills, balms and salves, and plasters, as well as the correct use of a hygrometer in order to guarantee the correct mixing ratio of liquids. In two letters of advice later added to manual, Jan Hendrik van Swinden (1746-1823) and Gerardus Vrolik (1775-1859) even offered a reading list

[55] Ibidem.

comprising eleven French, German, and British books on botany and chemistry such as the latest edition of the British *Pharmacopoeia*, Nicholas Lémery's *Dictionnaire ou traité universel des drogues* (various editions), Antoine François Fourcroy's *Leçons élémentaires d'histoire naturelle et de chimie* (1782), Christoph Girtanner's *Neue Chemische Nomenklatur* (1791) and Johann Christian Wilhelm Remler's *Das Neue Chemische Wörterbuch* (1793).[56] From that moment on, these titles played an important role in the education of apothecaries in Amsterdam.

Studying Medicinal Plants at the *Hortus*

Until the emergence of an industrial chemical industry in the second half of the nineteenth century, knowledge about living and dried plants and herbs formed one of the competences chemist-apothecaries needed to acquire. Reinwardt and his brother thus frequently went on botanical field trips and excursions to the environs of Amsterdam and participated in classes at Amsterdam's *hortus medicus* at the Plantage Middenlaan.[57] These classes were usually conducted by the professor for botany at the Amsterdam Athenaeum Illustre. The *hortus* was thus one of the primary places where generations of young chemist-apothecaries learned how to identify medicinal and other plants. Before the foundation of the Amsterdam *hortus* in 1636, medicinal herbs and plants were mostly grown in gardens attached to monasteries and hospitals such as the Minderbroederklooster at the Kloveniersburgwal in the centre of Amsterdam.[58] The access to the Amsterdam *hortus medicus* was, however, restricted. While normal visitors had to pay an entrance fee, medical doctors, surgeons, chemists, apothecaries and their apprentices and assistants could enter the garden as often as they wanted. Their yearly contribution to the guild included free entrance to the garden. Apothecaries could even purchase medicinal herbs.[59]

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[56] W.F. Daems, "Onze Nederlandsche Pharmacopeeën," *Pharmaceutisch weekblad* 72 (1935): 1092-3.

[57] UB Leiden, BPL 611, Reinwardt's botanical diary, which runs from 1797 until 1850.

[58] On the close relationship between the education of apothecaries and the *hortus* see D.O. Wijnands, E.J.A. Zevenhuizen and J. Heniger, *Een sieraad voor de stad. De Amsterdamse Hortus Botanicus, 1638-1993* (Amsterdam: Amsterdam University Press, 1994), chapters 1-4, and Haver Droeze, *Het collegium medicum*, 138-45.

[59] See also W. Stoeder, *Geschiedenis der pharmacie in Nederland*, 1891 (Reprint Schiedam: Schie-Pers, 1974) for regulations and lists of fees.

The Amsterdam *hortus* housed several beds and greenhouses for a large number of domestic and exotic plants. At least in 1768, a couple of years before Reinwardt arrived in Amsterdam, the external area was divided into two large beds, one for medicinal plants and one for flowers. The bed for medicinal plants was again divided into three parts which were surrounded by a boxwood hedge. Every bed had its specific number. The plants in the beds were sorted according to the *Florae Leydensis prodromus* which Adriaan van Royen (1704-79), director of the botanical garden in Leiden, and the Swedish botanist Carolus Linneaus (1707-1778), had devised in the 1730s. Along the eastern walls of the garden one could find useful plants which the director of the garden used to instruct apothecaries, students and surgeons. The various heated glass houses contained plants from South Europe, the Middle East and the East and West Indies.[60]

When Reinwardt and his brother started visiting the garden in the late 1780s, the *hortus medicus* was directed by Nicolaas L. Burman (1734-1793) who had succeeded his father Johannes Burman (1706-1777) in 1777. Burman junior, who had studied medicine and botany in Leiden and Uppsala, held several positions in Amsterdam: beside his function as director of the *hortus,* he was attached to the Athenaeum Illustre as professor for botany and worked as physician at a female shelter. Moreover, he was inspector of the *collegium medicum,* the central regulatory institution for medical practitioners in Amsterdam.[61]

The staff of the *hortus* was quite limited. Beside its director and a few garden workers, the *hortus* only employed one hortulanus. While the hortulanus took care of the cultivation and cataloguing of the plants in the garden, the director was responsible for the exchange of plants with other botanical gardens within the Low Countries and abroad. The Burmans regularly exchanged seeds and living plants with gardens in Leiden, The Hague, Utrecht, Groningen and Rotterdam. Moreover, they acquired flowers, trees and medicinal herbs from farmers and planters in Aalsmeer, Haarlem, Lisse, Naarden, Kampen and Noordwijk. They also regularly corresponded with plant experts in Denmark, Sweden, Russia, Italy, the Americas and German speaking countries.

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[60] One of the most important contemporary descriptions of the Amsterdam hortus is a handwritten overview by D. Deutz who inspected the garden in 1768. The manuscript is published in E. van der Pool-Stoofkoper, *Een reconstructie van de Hortus Medicus Amstelodamensis, 1682-1800* (Amsterdam: 1984), 73-86. (= doctoraalscriptie/MA thesis).

[61] Wijnands, Zevenhuizen, and Heniger, *Een sieraad voor de stad*, 104-105.

The most important deliveries, however, came from the overseas territories where the Dutch West India Company (Geoctroyeerde Westindische Compagnie) and East India Companies (Verenigde Oostindische Compagnie, or VOC) had established a powerful network of botanical gardens which regularly exchanged flowers, herbs, and other economically exploitable plants.[62] Important collectors were company servants such as Christiaan Kleynhoff, Franciscus Albertus Pryon, Henricus van Santen and Hendrik Otto van Oudgaarden. Kleynhoff and Pryon had first served as ship's surgeons aboard VOC ships and subsequently established a garden for medicinal plants in the outskirts of Batavia. From 1760 onwards Pryon regularly dispatched plants and drawings from Java to the *hortus* in Amsterdam. Van Santen provided Burman father and son with specimens from the Coromandel Coast where the Dutch had established several settlements. Van Oudgaarden gathered specimens at the Cape.[63] The *hortus* thus housed a large number of living and dried plants from the Cape, India, the Malay Archipelago, Japan, China, Brazil, and Suriname. In the 1780s, Burman junior even managed to further increase their collection by exchanging plant seeds with the botanical garden in Kew.[64]

The immense influx of useful and other plants from abroad transformed the Amsterdam medicinal garden into a vital centre for the study of the flora of extra-European regions and its collection was a major resource for a number of botanical works on the flora of the Asian and American tropics as well as South Africa. Using his immense library and private herbarium, Burman published on the flora of Ceylon (*Thesaurus Zeylanicus*, 1737) and the Cape (*Rariorum Africanarum plantarum decades*, 1738-39) and he won the right to publish the manuscript of *Het Amboinsche Kruid-boek* (1741-1750), which the VOC servant Georg Everhard Rumphius (1627-1702) had compiled on Ambon during his service there. In the 1760s, his son Nicholaas Burman focused his attention on the flora of the Cape, and the East- and West Indies. In his *Flora Indica* (1768) he compiled an overview of all known plants of those regions.[65]

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[62] For an overview, see Cook, *Matters of exchange*, chapter 8.

[63] For an in-depth research of these four collectors, see P.J. Florijn, "Biographical notes about four plant collectors in Asia mentioned by N.L. Burman in his *Flora Indica* (1768)," *Taxon* 36:1 (1987): 34-36.

[64] For an overview of the collectors network of Johannes and Nicolaas Burman, see Wijnands, Zevenhuizen, and Heniger, *Een sieraad voor de stad*, 107-11.

[65] Ibidem, 111-16.

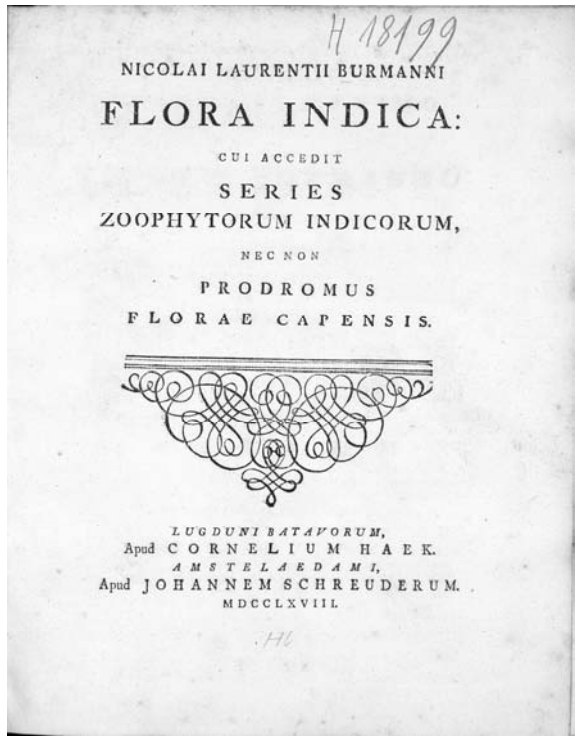

Figure 7: Cover of *Flora Indica* by N. Burman, Amsterdam, 1768.

The Burmans had to teach four times a week at the *hortus medicus*. On Tuesdays and Thursdays, they instructed apothecaries, chemists and surgeons in Dutch about useful medicinal plants (*usualia*) which were listed in the latest version of the *Pharmacopoea,* the practical manual for every apothecary in Amsterdam. One of the first botanists in Europe, Johannes Burman used and taught the binominal nomenclature of Linneaus, who visited him in Amsterdam in 1735 in order to study the rich herbaria, botanical gardens, private cabinets and libraries which the Low Countries offered.[66]

On behalf of Burman, the Linnaean system of naming plants was also added to the *Nieuwe Amsterdamsche Apotheek*, the practical manual for apothecaries in Amsterdam published in 1795.[67] After the younger Burman's

[66] P.L. Farber, *Finding order in nature. The naturalist tradition from Linnaeus to E.O. Wilson* (Baltimore: Johns Hopkins University Press, 2000), 9.

[67] SA Amsterdam, 27: Archief van het collegium medicum, collegium obstetricium en plaatselijke commissie van geneeskundig toevoorzicht, inv. 6, fol. 36-40.

death in 1793, the botanical classes were taken over first by Nicolaas Bondt (1765-1796) and then by Gerardus Vrolik.

Enjoying Patriot Sociability

Although Reinwardt must have spent most of his time earning his living at his brother's chemical workshop, much evidence points to the fact he and his brother became involved in two of Amsterdam's oldest literary societies: Concordia et Libertate (1748) and then Libertate et Concordia, the so-called 'Friday society' founded a few years later. Reinwardt's practical expertise as chemist and his command of Latin and Greek, which he studied at night, must have paved the way to his being accepted in these circles. Almost all of Reinwardt's later acquaintances and friends such as Jeronimo de Vries (1776-1853), Anton Reinhard Falck (1777-1843), Johan Melchior Kemper (1776-1824), Matthijs Siegenbeek (1774-1854), Cornelis van Vollenhoven (1778-1849), David Jacob van Lennep (1774-1853) and others participated in one or more of these societies.[68] In later letters, Reinwardt often refers to lively and amicable discussions in these societies which shared, as W. van den Berg has put it, a strong belief in the 'progress in arts and sciences'.[69]

The members of Concordia et Libertate met every Tuesday in the St. Luciensteeg, near the Pijpenmarkt, to discuss literary texts or listen to lectures from experts in various scientific fields. Every member was allowed to introduce three friends, unless the speaker refused their presence. Although the Tuesday society did not publish proceedings, every member was obliged to give at least three lectures in six years. Many of the members

[68] J. van Lennep, *Het leven van mr. Cornelis en mr. David Jacob van Lennep*, vol. 3 (Amsterdam: Frederik Muller, 1861-62), 200-201, and A. Hanou, *Sluiers van Isis. Johannes Kinker als voorvechter van de Verlichting in de vrijmetselarij en andere Nederlandse genootschappen, 1790-1845* (Deventer: Uitgeverij Sub Rosa, 1988), 445-49.

[69] Quote by W. van den Berg, "Literary sociability in the Netherlands, 1750-1840," in *The Dutch Republic in the eighteenth century. Decline, enlightenment, and revolution*, ed. Margret C. Jacob et al. (Ithaca: Cornell University Press, 1992), 253. For Reinwardt's retrospective references, see Reinwardt to Falck, Batavia, 20 May 1818, in *Gedenkstukken der Algemeene Geschiedenis van Nederland 1795-1840*, ed. H.T. Colenbrander, ('s-Gravenhage: Martinus Nijhoff, 1915), vol. 8 (II), 193. and NHA Haarlem, letter Reinwardt to Van Marum, Kaapstadt, 4 February 1816.

also used the meetings to voice their concerns about the moral, political and economic decline of the late Dutch Republic.[70]

Concordia et Libertate thus formed an important platform for the so-called patriot movement in the city which had gained momentum in the city after the disastrous outcome of the Fourth Anglo-Dutch War. In particular the loss of nearly the entire merchant fleet stirred unrest among merchants, bankers, manufacturers, lawyers, apothecaries, and chemists, all of whose businesses depended on the import of raw material from the colonies in the East and West Indies and the Baltic Sea.[71] Many believed that Willem V (1748-1806), the official commander of the army and navy, would prove too weak to reform the country's economy and administration to prevent similar attacks from external powers. In the preceding decades, Willem had made a major effort to merge the military interests of the coastal provinces with those in the hinterland. While the former demanded more money for the equipment of a better fleet to safeguard their mercantile interests, the latter sought more expenditures for a powerful army to protect their inland borders.[72]

The members of Concordia et Liberate considered chemistry as a crucial tool to improve the country's political and economic situation. From 1790 onwards, the society's meetings formed an important platform for The Society of Dutch Chemists (Het Gezelschap der Hollandsche Scheikundigen). The Society was a group of friends who irregularly came together at the Plantage in Amsterdam to socialize and carry out experiments in public, which allowed them to engage in a broader international debate on various issues in chemistry, such as the new claim that water was a compound of oxygen and hydrogen. The core of their chemistry was the extensive usage of measuring devices.[73]

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[70] M.C. Jacob, "Radicalism in the Dutch Enlightenment," in *The Dutch Republic in the Eighteenth Century. Decline, Enlightenment, and Revolution,* ed. Margret C. Jacob et al. (Ithaca: Cornell University Press, 1992), 236-37.

[71] For an overview of the events in Amsterdam, see M. Hell, "Revolte, rust en revolutie, 1747-1795," in *Geschiedenis van Amsterdam*, vol. 2b, Zelfbewuste *stadstaat, 1650-1813*, ed. Willem Frijhoff, et al., 355-75 (Amsterdam: Sun, 2005).

[72] N.C.F. van Sas, "The patriot revolution: New perspectives," in *The Dutch Republic in the Eighteenth Century. Decline, Enlightenment, and Revolution,* ed. Margret C. Jacob et al. (Ithaca: Cornell University Press, 1992), 97-98.

[73] H.A.M. Snelders, *Het gezelschap der Hollandsche scheikundigen: Amsterdamse chemici uit het einde van de achttiende eeuw* (Amsterdam: Rodopi, 1980).

Despite the informal organization of the members of the Society, they managed to carry out important experiments and published a large amount of influential chemical publications in a period of only ten years. The majority of the results were published in the journals *Recherches physico-chymiques* (1792-94) and the *Natuur-Scheikundige Verhandelingen* (1799-1808). In order to inform others about their results, they regularly summarized their proofs in the form of letters which various learned and amateur societies in the Netherlands and abroad published in their proceedings.[74]

The journal of the Society of Dutch Chemists was financially supported by five wealthy Amsterdam merchant bankers who were in close contact with Amsterdam's chemical industry.[75] Two of the sponsors, Henry Hope (1735-1811) and his brother Thomas Hope (1769-1831) specialized in the diamond trade, international banking, and the export of sugar to Russia.[76] Other sponsors were Willem Six van Otterleek (1761-1811), Hendrik Muilman (1743-1812) and Pieter Muilman (1750-1819), and as well as Theodorus Pieter de Smeth (1789-1843). Van Otterleek worked as secretary of a private colonial enterprise, the Societeit van Suriname, which had been tightly interwoven with the Dutch West India Company, which was dissolved in 1791. Pieter Muilman was an alderman in Amsterdam. De Smeth was engaged in the company of Raymond en Theodoor de Smeth, which his father had founded in Amsterdam in 1736. His father also owned a brewery in Amsterdam. Like Hope & Co., Raymond en Theodoor de Smeth specialized in international trade banking with a special focus on Russia.[77]

In the 1790s, the members of the Society of Dutch Chemists held various lectures at Concordia et Libertate in which they promoted the usefulness of their experimental and quantitative approach for physicians,

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[74] L. Roberts, "Science dynamics". The Dutch meet the 'new' chemistry," in *Lavoisier in European context. Negotiating a new language for chemistry,* ed. Bernadette Bensaude-Vincent, et al. (Canton, Mass.: Science History Publications, 1995), 103-104.

[75] E. Cohen, "Chemisch-historische aanteekeningen XVII," *Chemisch weekblad* 37 (1940): 489.

[76] On the connection between the Hope brothers and the Amsterdam chemical community, see L. Roberts, "An Arcadian apparatus. The introduction of the steam engine into the Dutch Landscape," *Technology and Culture* 45:2 (2004): 251-76, and the more general M.G. Buist, *At spes non fracta. Hope & Co 1770-1815. Merchants bankers and diplomats at work* (Den Haag: Martinus Nijhoff, 1974), 3-69.

[77] Jonker, *Merchants, bankers, middlemen,* 190.

apothecaries and manufacturers.[78] In December 1789, the merchant Adriaan Paets van Troostwijk (1752-1837), one of the founders of the Society, discussed the experiments which they had carried out to analyze the composition of water, and in November 1795, the merchant gave a general overview of the history of chemistry. A year later the director of the Amsterdam hortus Nicolaas Bondt lectured on the medical applications of chemistry. In late 1799, the doctor Jan Rudolph Deiman (1743-1808) lectured about the positive consequences of Lavoisier's chemical practices and on the question of how to identify and measure the different physical forces in nature. In the same year, Vrolik explained the similarities between animals and plants and the simplicity of nature as regards the cultivation of economically exploitable crops. Reinwardt himself lectured at Concordia et Libertate in 1803 and 1804. In his first lecture, he discussed how our knowledge of the earth's atmosphere can explain and improve various industries (*menselijke kunstverrichtingen*). His second presentation dealt with observations regarding the age of the earth and the geological changes which must have taken place in the past.[79]

In contradiction to Concordia et Libertate, the so-called Friday's society, Libertate et Concordia, put its emphasis on the pleasant, amicable and enjoyable exchange of ideas during their weekly gatherings. Central aim of Libertate et Concordia was to establish and promote contacts across social classes. During their weekly gatherings, it was quite normal for academics to mingle with learned merchants, apothecaries, medical doctors and even farmers. The freedom to discuss literature and political and social issues formed the uniting element of the group.

Some members of Libertate et Concordia even initiated publication of a weekly journal, *De Arke Noach*, which appeared first in January 1799. The most important contributors were Van Lennep, De Vries and Falck. Various other Amsterdam *literati* such as Cornelis Loots (1765-1834), Jan Frederik Helmers (1767-1813), Robert Hendrik Arntzenius (1777-1823), Johannes Kinker (1764-1845) and Jacobus Scheltema (1767-1835) regularly

[78] The titles of the lectures can be found in M. van Hattum, *Lezingen en verhandelingen in 'Concordia et Libertate' (1769-1806) en 'Felix Meritis' (Dep. Letterk.) (1779-1808, 1810-1832, 1865-1873)* (Amstelveen: 1983).

[79] The full titles of Reinwardt's lectures were: *Over de invloed onzer tegenwoordige kennis van de dampkring op de voornaamste verschijnselen der natuur en op die menselijke kunstverrichtingen die hieruit alleen kunnen en moeten worden verklaard* (1803) and *Enige gedenkstukken van de ouderdom der aarde en de verbaazende omwentelingen die aan haar tegenwoordige gesteldheid moeten zijn voorafgegaan* (1804).

contributed articles. These covered a wide range of topics and the authors promoted literature and art as a crucial means of mitigating the seeming moral and economic decline of the Dutch Republic.[80]

This brief analysis of Concordia et Libertate and Libertate et Concordia has revealed that both societies functioned as important platforms in Amsterdam for propagating various reform ideas. While some claimed reforms on a political level, others considered literature, arts, sociability, medicine, education, and useful 'scientific' knowledge as primary tools for the improvement of Dutch society, and precise borders between the different groups can hardly be drawn. But it was this shared culture of civic improvement that provided historical actors such as Reinwardt with a powerful social and intellectual framework for their future careers.

It is therefore not surprising that Reinwardt first aimed at continuing his career at the Georgia Augusta University in Göttingen, where he had established contact with the plant physiologist and physician Johann Friedrich Blumenbach (1752-1840).[81] Since its foundation in 1734, the university in Göttingen had served as an important stepping stone for young students from all over Europe to further their career as academically trained administrators. By studying 'cameral sciences', which comprised a wide range of subjects such as taxation systems, land rights, regalian rights, botany, technology, chemistry, mining, geology, forestry, and natural history, they hoped to receive high positions at one of the courts or academies of the fragmented Holy Roman Empire. As 'cameralists' they were responsible for the efficient exploitation of the land and inhabitants of their superiors' territories. Since most German states did not possess any colonies and were not connected with international trading networks, efficient and innovative agricultural practices and processing industries were vital for the functioning of the often small territories.[82]

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[80] Van Lennep, *Het leven van mr. Cornelis*, 3.200-201, and Hanou, *Sluiers van Isis*, 484-94.

[81] For more details on Blumenbach's vitalist physiology, see P.H. Reill, "The legacy of the "Scientific Revolution. Science and the enlightenment," in *Cambridge History of Science*, vol. 4, *Eighteenth-Century science*, ed. Roy Porter (Cambridge: Cambridge University Press, 2003), 32-41.

[82] For a fascinating analysis of the complex relationship between economic development, cameralism and agricultural science in the states of the Holy Roman Empire, see A. Wakefield, *The disordered police state. German cameralism as science and practice* (Chicago: University of Chicago Press, 2009) and M. Popplow, "Economizing agricultural resources in the German economic enlightenment," in *Materials and expertise in Early*

Conclusion

This chapter has focused on Reinwardt's socialization as Dutch citizen and his training as chemist in Amsterdam in the late 1780s and 1790s. A reconstruction of his social and material world has revealed that in particular the chemical education underwent major transformations in this period. While Amsterdam's academically trained physicians considered chemistry as an annex to the medical sciences, engaged apothecaries, chemists and merchants launched various initiatives to improve the chemical education in the city. The underlying reasons for these initiatives were wide ranging. 'Oeconomic patriots' such as Schonck and Kasteleyn argued for reform and greater attention to chemistry out of their concern for the state of their enterprises, Dutch society and the economy. Some apothecaries and producers of chemicals hoped that a standardized training of apprentices would protect their businesses from untrained practitioners, while Amsterdam's merchants hoped that a better chemical education would increase the efficiency of the city's refineries in times of dwindling stocks and rising prices for raw material from overseas. They not only urged the city council to install a public lecturer for chemistry, but they agreed to pay his entire salary. Moreover, they helped finance the Society of Dutch Chemists' publication of a journal in order to spread the results of their various experiments.

During his years as apprentice at his brother's chemical workshop, Reinwardt was thus trained in four fields. He became an expert in observing and harnessing the forces of nature in laboratories in an 'oeconomic' way. He received training as an observer and collector of medicinal plants in the field. He learned how to handle the large number of measuring devices which were necessary to enhance procedures such as distillation and sublimation. And he acquired a thorough understanding of Latin and Greek in order to read the classical literature, one of the most important preconditions for acceptance among Amsterdam's learned elite which regularly came together to practice different forms of 'sociability'. The following chapters will show that it was exactly this mix of expertise that allowed Reinwardt to embark quickly on his career as an academic at the university in Harderwijk in the aftermath of the Batavian Revolution of 1795, following which improvement, efficiency, quantification, and standardization became the guiding principles for reform in almost all public domains.

Modern Europe. Between market and laboratory, ed. Ursula Klein and E.C. Spary (Chicago: University of Chicago Press, 2010), 261-87.

2

Governing an Imagined State

The marvelous splendor of commerce, through which shallow statesmen are pitifully blinded, should not make us forget its fleeting nature! One can only consider states as successful and in full secure control of their resources, if they properly apply their national power to bring agriculture to the highest level of perfection that can be achieved.

Annual report of the Gelderland
Committee for Agriculture, 1807.[1]

It must have been a big relief for Reinwardt when he heard about his appointment as professor of natural history, chemistry and botany at the University of Harderwijk. For many academics, the university in Harderwijk was a stepping-stone for better jobs at the academies in Utrecht, Leiden, or Amsterdam.[2] It was in particular his friends in Amsterdam who had actively supported his nomination as successor to Christiaan Paulus Schacht (1767-1800), professor of medicine and botany in Harderwijk since 1792 who had

[1] J. Kops, *Magazijn van Vaderlandschen landbouw* 3 (1807): 53: "De schitterende glans van den Koophandel, waardoor oppervlakkige Staatsmannen te jammerlijk verblind worden, moet ons zijnen korten duur en vergankelijkheid niet doen voorbij zien! Men kan alleen zulke Staten als voorspoedig en in het veilig bezit van hunnen rijkdom beschouwen, daar eene gepaste aanwending van het nationale vermogen den Landbouw tot den hoogsten graad van volmaaktheid brengt, waar voor dezelve vatbaar is."

[2] J.A.H. Bots, "Het benoemingsbeleid van de Gelderse curatoren," in *Het Gelderse Athene. Bijdragen tot de geschiedenis van de Gelderse universiteit in Harderwijk (1648-1811)* (Hilversum: Verloren, 2000), 60-62, and R. Aerts and L. Hoogkamp, *De Gelderse Pallas. Gymnasium Illustre, Gelderse Universiteit, Rijksathenaeum te Harderwijk, 1600-1800* (Barneveld: BDU, 1986), 81.

unexpectedly passed away.[3] Owing to the recommendation of Gerardus Vrolik, director of the botanical garden in Amsterdam, the Harderwijk academic senate eventually accepted Reinwardt's nomination and awarded him an honorary doctorate in medicine and philosophy.

By the time Reinwardt assumed his new position as professor of natural history, chemistry and botany at Harderwijk in 1800, the political landscape in the Netherlands had changed tremendously. After French and Dutch troops had taken power from stadholder Willem V in 1795, the patriots had sparked various initiatives to transform the newly named Batavian Republic into an economically efficient and financially rewarding state.[4] While some patriots argued for a centralized state, others propagated a more federalist structure. The economic situation they faced was, however, challenging. As a result of changing patterns in the world market and the rise of other European port cities such as Hamburg as centres for trade, public debt had risen to almost 500 million guilders in 1794/95.[5] Mounting food prices, continuous interventions and claims by the French government in Paris for assistance rendered the liquidation of the Dutch East India Company (VOC) and the subsequent loss of almost all the colonial possessions in the Malay Archipelago further aggravated the situation.[6]

The reforms initiated by the patriots thus had a wide scope: noblemen as well as prosperous regents lost their hereditary privileges and provinces had to abandon their old names and their political and

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[3] On Schacht, see H. Bouman, *Geschiedenis van de voormalige Geldersche hoogeschool en hare hoogleraaren*, vol. 2 (Utrecht: J.G. van Terveen en Zoon, 1847), 506-508.

[4] For an overview of the complex historiography of this period see, M.J. van der Burg, *Nederland onder Franse invloed. Cultuurtransfer en staatsvorming in de napoleontische tijd. 1799-1813* (Amsterdam: De Bataafsche Leeuw, 2009), 18-24; J. Kloek and W. Mijnhardt, "Vantage point," in *Dutch culture in a European perspective*, vol. 2, *1800: Blueprints for a national community*, ed. Joost Kloek and Wijnand Mijnhardt et al. *(*Royal van Gorcum: Assen, 2004), 15-19, and N.C.F. van Sas, *De metamorfose van Nederland. Van oude orde naar moderniteit, 1750-1900* (Amsterdam: Amsterdam University Press, 2004), 17-39 and 175-94.

[5] J.M.F. Fritschy, *De patriotten en de financiën van de Bataafse Republiek. Hollands krediet en de smalle marges voor een nieuw beleid (1795-1801)* ('s-Gravenhage: Stichting Hollandse Historische Reeks, 1988), 40-41.

[6] M.J. van der Burg, "Transforming the Dutch Republic into the kingdom of Holland: the Netherlands between republicanism and monarchy (1795-1815)," *European Review of History* 17:2 (2010): 151-70; De Vries and Van der Woude, *The first modern economy*, 681-67, and for more details on the political events in Asia, J. van Goor, *Prelude to colonialism. The Dutch in Asia* (Hilversum: Verloren, 2004), 83-98.

administrative independence. On a national as well as on a provincial level, various committees and institutions replaced now defunct administrative entities. To get an exact overview of the current state of the Batavian Republic, the new Executive Committee (*uitvoerend bewind*) appointed several national 'ministers' (*agenten*) for finance, war, the merchant marine, justice, foreign policy, policy and public works, and national education and economy. These agents were asked to compile reliable statistics and to propose concrete measurements to centralize and improve their respective domains. Subordinate bodies were established on a departmental level.[7] In the end, the various surveying projects led to an enormous amount of information and often conflicting plans for revitalizing and further improving the economy of the Batavian Republic and its impoverished possessions in the Malay Archipelago.[8]

This chapter illustrates how the academic Reinwardt became gradually involved in the surveying and reorganization endeavours of the Batavian administrators. By applying his botanical as well as his chemical expertise to the needs of the new state, the former apothecary and chemist proved himself a reliable and efficient aide of the new government. As the chapter will illustrate, his contributions were manifold. As member of the Departmental Committee for Medical Supervision (*Departementale commissie van geneeskundig onderzoek en toevoorzicht)* he helped to improve and standardize the training of future surgeons and apothecaries. As a member of the Committee for Agriculture *(Commissie van landbouw)* he compiled reports on the efficient usage of the natural resources of the department of

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[7] For an overview of the new institutions and committee, see T. Pfeil, *Tot redding van het vaderland.' Het primaat van de Nederlandse overheidsfinanciën in de Baataafs-Franse Tijd 1795-1810* (PhD thesis, University of Amsterdam, 1998), chapter 5; H. Boels, *Binnenlandse zaken. Ontstaan en ontwikkeling van een departement in de Bataafse tijd, 1795-1806. Een reconstructie* (Den Haag: SDU Uitgeverij Koninginnegracht, 1993), 197-264; and Fritschy, *De patriotten en de financiën,* 104-18.

[8] P.M.M. Klep and A. Verheusen, "The Batavian statistical revolution in the Netherlands, 1798-1802. Frequency, formats, administrative success, and political background," in *The Statistical Mind in a pre-statistical era: The Netherlands 1750-1850,* ed. Paul M.M. Klep, et al., 217-40 (Amsterdam: Aksant, 2002), and K.J.P.F.M. Jeurgens, "Een nieuw verschijnsel: enquêtes en registraties door de overheid," in *Noord-Brabant in de Bataafs-Franse tijd, 1794-1814. Een institutionele handleiding,* ed. J.G.M. Sanders, et al., 264-85 ('s-Hertogenbosch: Rijksarchief in Noord-Brabant, 2002). A useful guide through the fragmented archival sources offers K.J.P.F.M. Jeurgens and P.M.M. Klep, *Informatieprocessen van de Bataafs-Franse overheid* (Den Haag: Instituut voor Nederlandse Geschiedenis, 1995).

Gelderland. And eventually he helped Jan Kops (1765-1849), one of the central figures in the new administration, to finish a volume of a splendidly illustrated guide which documented and described all medicinal and other useful plants in the Batavian Republic. As professor in Harderwijk, Reinwardt taught future physicians and apothecaries about how knowledge of chemical processes and medicinal plants could help improve society.

His administrative career allowed Reinwardt to cloak himself in a new identity. This was revealed in two lectures held at the University of Harderwijk. In the first lecture, given right after his appointment in 1800, the former chemist Reinwardt fashioned himself as fearless naturalist who dared to travel through wild nature to detect and harvest medicinal and economically exploitable plants. In the second, after he had resigned as the university's chancellor in 1803, Reinwardt promoted himself as an expert who was able harness the forces of nature to various ends by experimenting with a large number of costly measuring instruments and other chemical hardware both in his expanding laboratory in Harderwijk and in the field. To increase the readership, both lectures were eventually translated into Dutch and published in the Haarlem-based and widely read *Vaderlandsch magazijn van wetenschap, kunst en smaak* (National Magazine for Science, Art and Taste).

Reinwardt's new identity was rooted in a wider political climate where exact measurement, field observation, and travelling were considered core tools for the improvement and rationalization of agriculture, the economy and society. Not only 'naturalists' but also influential revolutionary administrators such as Johannes Goldberg and Jan Kops travelled, measured and observed to transform the fragmented Batavian Republic into a centralized, efficient and unified state. Science and Batavian governance thus appear as closely intertwined and co-evolutionary endeavours.

Surveying and Improving the Batavian Republic

One of the main concerns of the Batavian administrators was the rising public debt. To gain a clearer overview of the country's actual economic situation, the Executive Committee installed Johannes Goldberg as Minister for National Oeconomy in 1798. Goldberg, who formerly earned his living as an insurance broker in Amsterdam, was a fervent supporter of the patriot

movement. An engaged member of various revolutionary committees, he had paved his way for a steep career under the new regime.[9]

Figure 8: Portrait of J. Goldberg by C.H. Hodges, around 1800.

By drawing upon concepts and ideas which cameralists in Germany and physiocrats in France, Britain and Sweden had developed, Goldberg set up a large and centralized survey project in which he combined the accumulation of statistical data with an in-depth analysis of the practices and technologies involved.[10] Together with his aide, Jan Kops, Commissioner for Agriculture (*commissaris van landbouw)*, he developed questionnaires, long lists and tables which they dispatched to the eight new departments of the

[9] W.M. Zappey, *De economische en politieke werkzaamheid van Johannes Goldberg* (Brussel: N. Samson, 1967), 21-25.

[10] H.W. Lintsen, "Het verloren technisch paradijs," in *Geschiedenis van de techniek in Nederland*, vol. 6, *Techniek en samenleving*, ed. H.W. Lintsen (Zutphen: Walburg Pers, 1995), 48. For an overview and contextualization of similar surveying endeavors in Britain and France in the eighteenth century see Drayton, *Nature's government,* chapters 3 and 4, and E.C. Spary, *Utopia's garden. French natural history from old regime to revolution* (Chicago: University of Chicago Press, 2000), chapter 3.

Batavian Republic. Both hoped that engaged local administrators and citizens would fill in the forms and return them to The Hague where their ministry was settled.[11]

Kops, who had studied theology and physics at the Athenaeum Illustre in Amsterdam, was an experienced surveyor.[12] Beside his profession as pastor in Leiden, he had carried out a large agricultural and botanical field survey of the dunes near Katwijk and Noordwijk. His efforts resulted in an extensive report on how these dunes could be transformed into fertile and economically productive farmland. The report came off the press in 1798/99 and comprised not only information about the size of the far-stretched dunes but also about medical plants, animals and trees which Kops and his local helpers had identified in the field. To develop the area, Kops advised his superiors in The Hague to clarify the ownership of the dunes and to establish agricultural colonies where poor and jobless people could be employed.[13]

A brief analysis of Kops' and Goldberg's agricultural survey (*landbouwênquete*) of 1800 sheds more light on the structure and scale of their joint endeavour.[14] The questionnaire, which was based on similar surveys carried out in Sweden, Switzerland, France and England, comprised a total of 253 questions.[15] These were grouped in categories such as farmland, pasture land, treatment of cattle, milk products, forest, fruit trees, vegetable gardens (*moesland*), status of farms and peasants, infertile and waste lands, common land and markets. All respondents were asked to give their names

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[11] Van der Woude, "Ontstaan en plaatsbepaling," 15-28.

[12] For more biographical details on Kops see J. Baert, *Jan Kops. Pionier van Hollands landbouw* (*Handelingen en geschriften van het Indisch genootschap te 's-Gravenhage*: Martinus Nijhoff, 1943); and H. Blink. *Geschiedenis van den boerenstand en den landbouw in Nederland*, vol. 2 (Groningen: J.B. Wolters, 1904), 279-81.

[13] Comissie van superintendentie over het onderzoek der duinen, *Tegenwoordige staat der Duinen van het voormalig gewest Holland*, volume 2 (Leiden: Herdingh en du Mortier, 1799), 5-30 and 40-52.

[14] For more information on this survey and transcripts of all answers, see J.M.G. van der Poel, "De landbouwênquete van 1800. I. Noord- en Zuid-Holland," *Historia agricultura.* 1 (1953): 48-194; J.M.G. van der Poel, "De landbouwênquete van 1800. II. Zeeland, Noord-Brabant, Utrecht, Gelderland and Overijssel," *Historia agricultura* 2 (1954): 45-233. J.M.G. van der Poel, "De landbouwênquete van 1800. III. Drenthe, Friesland en Groningen," *Historia agricultura* 3 (1955): 105-76.

[15] J. Kops, "Bijdragen tot de kennis en historie van den vaderlandschen landbouw. Landbouwkundige voorstellen en raadgevingen door onze landgenoten medegedeeld," *Magazijn van vaderlandschen landbouw* 1 (1804): 86-87.

and the altitude and general soil condition their observations were referring to. Questions were for instance:

1. What is the nature of the different lands in the respective district or arrondissement. . . ?
2. Do [these lands] contain marl or other chalk soil [*kalkaardige aarde*]? Where can it be found? . . .
14. What kind of fertilizers are used, which are considered the best, and are [homemade] or purchased fertilizers used?
15. Are chemically produced fertilizers [*konst-mesten*] used?
16. How is the [home-made] fertilizer produced and stored? . . .
81. How are horned cattle, both old and young, bred, fed, and treated in the sheds? . . .
131. Which sorts of trees can be found in the district?
132. On what kind of land are they planted? . . .
150. What kinds of vegetables are cultivated?
151. Are they primarily cultivated for personal consumption? . . .
168. Is drinkable and healthy water for human beings and cattle available? Or is the water brackish and unhealthy?[16]

Since the response to their surveys was rather disappointing, Goldberg and Kops decided to depart on an 'oeconomic' journey (*huishoudelijk reis*) through the Batavian Republic to collect additional data and to observe and

[16] Ibidem, 89-105: "1. Welke is de verschillende natuur der gronden in het district of arrondissement, met de bijzonderheden die daaromtrent mogen plaats hebben? 2. Of er inzonderheid mergel of andere kalkaardige aarde is? En waar die bepaaldelijk gevonden wordt? . . . 14. Welke meststoffen men gebruikt en best bevindt, en of men eigen of gekogte mest gebruikt? 15. Of ook konst-mesten? 16. Hoe de eigen mest wordt vergaard en bewaard? . . . 81. Hoe het hoornvee, zoo jong als oud, aangekweekt, geweid, gevoerd, en op de stallen behandeld wordt? . . . 131. Welke onderscheide boomsoorten bevinden zich in het district? 132. Op welke onderscheide gronden? . . . 150. Welke onderscheide moeskruiden worden er geteeld? 151. Worden die alleen tot eigen gebruik geteeld? . . . 168. Is er goed drinkbaar en gezond water voor mensen en vee? Of brak en ongezond?"

talk to farmers, craftsmen and manufacturers *in situ.*[17] The journey took place between June and November 1800.

In order to communicate their field work to their superiors in The Hague and their fellow-countrymen, Kops and Goldberg later published the results in the form of two travel accounts titled Journal of the Minister for National Oeconomie (*Journaal der Reize van den Agent van Nationale Oeconomie*) and Account Recorded by the Commissioner of Agriculture (*Verbaal gehouden door den Commissaris van Landbouw*). Thanks to the growing publishing industry, the accounts were widely spread within the country. Moreover, travel accounts were at that time a well-established literary genre. Authors of such accounts usually combined personal observation with more general information on agriculture, economy and society of the countries visited. In many cases, their narratives were translated into other European languages. The British 'oeconomic' traveller Arthur Young (1741-1820) and the German Alexander von Humboldt were only the most famous examples to profit from the rapidly growing audience of interested readers in Europe.[18]

Improving Agriculture on a Departmental Level

Beside Kops and Goldberg's survey, the new administrators also initiated the establishment of agricultural committees on a departmental level. Since 1798, the country was divided into eight 'departments'. The new departments had been established in order to break the political authority and independence of the independent seven provinces which had constituted the Dutch Republic, for which reason they were given names unrelated to their predecessor territories; instead they were named Texel, Rhijn, Delf, Dommel, Schelde en Maas, Amstel, Oude Ijssel, and Eems. In 1805 the departments

[17] Zappey, *De economische en politieke werkzaamheid,* 48-52.

[18] The fascinating link between 'scientific' and 'oeconomic' travellers is further explored in Van der Woude, "Ontstaan en plaatsbepaling van de Goldberg-enquête," 16-18. For background information on the 'reading revolution' in the Netherlands see "The printed word," in *Dutch culture in a European perspective*, vol. 2, *1800: Blueprints for a national community*, ed. J. Kloek et al. (Assen: Royal van Gorcum, 2004), 73-92. Von Humboldt's travel account, titled *Voyages aux Régions équinoxiales du Nouveau Continent* came off the press between 1805 and 1834 in more than 30 volumes. On the difficult genesis and reception of this account, see O. Ette, "Der Blick auf die Neue Welt. Nachwort von Ottmar Ette," in *Alexander von Humboldt. Reise in die Äquinoktial-Gegenden des Neuen Kontinents,* vol. 2, ed. O. Ette, 1563-97 (Frankfurt am Main: Insel Verlag, 1991).

were again reconstituted and labelled Drenthe, Friesland, Utrecht, Gelderland, Holland, Zeeland, Overijssel and Brabant. In 1806, the department of Holland was eventually split in a northern and southern part.[19]

According to the general policy, every department received its own committee for agriculture, each usually comprising between six and twelve members. All of them were elected according to their agricultural expertise and political attitude. None of them was paid for their work, though the secretary received a small salary from 1807 onwards.[20]

The tasks of the departmental committees were wide ranging: beside their obligation to advise provincial and national administrators regarding all agricultural issues, they were supposed to collect agricultural and statistical data. Summary reports had to be sent to The Hague in April, August and November every year. Apart from their surveying function, they also travelled through the province and the costs of these tours were later reimbursed.[21] Many of the members visited efficiently managed farms, demonstrated the application of new agricultural tools, or distributed seeds for useful crops and plants among peasants in the countryside. The field work often formed the basis for longer and more visionary reports about how to further improve the output and quality of agricultural products in the department.

In order to increase the cohesion between the members, each committee gathered three times a year in the main place of the respective department. The Friesland committee met in Leeuwarden, the Drenthe committee in Assen, the Overijssel committee in Kampen and Deventer, the Gelderland committee in Zutphen or Arnhem, and the Utrecht committee in Utrecht, the North Holland committee in Alkmaar and Amsterdam, the South Holland committee in Rotterdam and Gouda, the Brabant committee in Den Bosch and Breda and the committee of the department Zeeland in Middelburg and Zierikzee. Once a year, the head of each committee had to report on its work at a general gathering in The Hague.[22]

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[19] E. Koolhaas-Grosfeld, "Charting unification," in *Dutch culture in a European perspective*, vol. 2, *1800: Blueprints for a national community*, ed. J. Kloek et al., 293-302 (Assen: Royal van Gorcum, 2004).

[20] J.M.G. van der Poel, *Heren en Boeren. Een studie over de commissiën van landbouw (1805-1851)*, (Wageningen: H. Veenman & Zonen, 1949), 95.

[21] Ibidem, 82-5.

[22] J. Kops, *Magazijn van vaderlandschen landbouw* 2 (1805): 513-24.

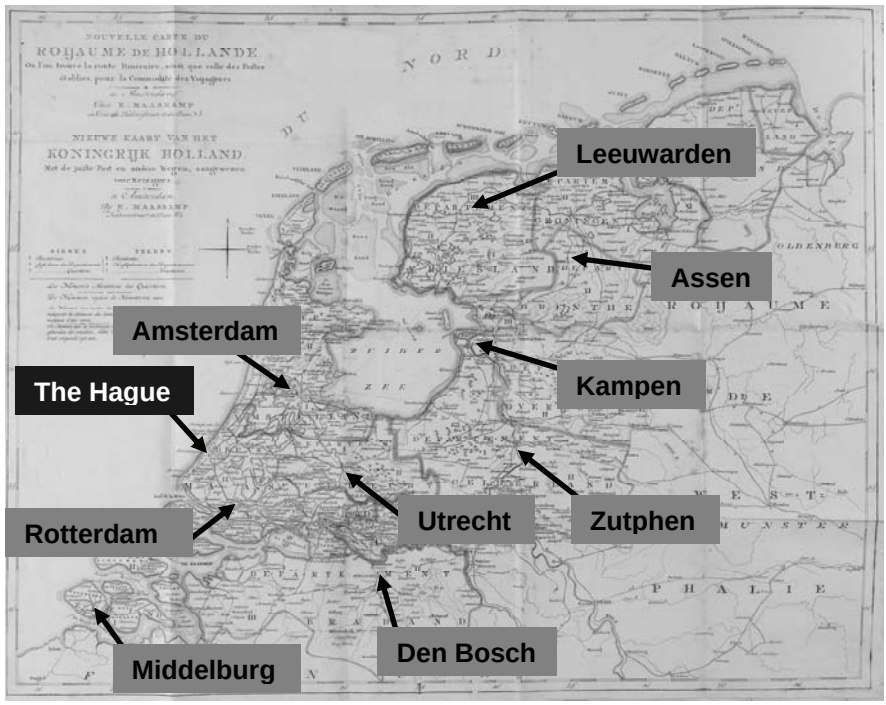

Figure 9: Map showing the places where the departmental Committees for Agriculture held their meetings.

The Gelderland Agricultural Committee

Owing to his botanical and chemical expertise, it is not surprising that Reinwardt was appointed as member of the Gelderland Committee for Agriculture, established in 1805. Owing to its university, Harderwijk was one of the main places of the department. Already in his inaugural lecture at Harderwijk four years before, Reinwardt had promoted the usefulness of surveying and observing agriculture and nature in the field. In the lecture titled "[*A*]*bout the ardour by which practitioners of natural history and botany are driven in their studies*",[23] Reinwardt placed himself in a long tradition of travelling and surveying naturalists who, as he put it, had fostered a desire to investigate nature in the wild with-out fearing the various dangers arising from work in the field. Citing as examples Linnaeus and other well known travelling naturalists such as Conrad Gesner (1516-65), Carolus Clusius

[23] The Latin title of the lecture is *Oratio de ardore quo historiae naturalis et imprimis botanices cultores in sua studia feruntur.*

(1526-1609), Joseph P. de Tournefort (1656-1708), Georg E. Rumphius, Charles Plumier (1646-1704), Albrecht von Haller (1708-77), and Johann J. Scheuchzer (1672-1733), who had explored the Bavarian mountains, the Pyrenees, the Alps, Lapland, Eastern Europe or more remote regions such as French Guyana and parts of Africa, Reinwardt defined 'field' as a primary site where such field work had to be carried out. For as he put it:

> Nature does not reveal her prophecies (*godspraken*) always there, where the one who seeks for advice is looking for it. Her temple is the entire globe, as far as it stretches; it [the globe] has to be traversed entirely by investigators (*onderzoekers*), if they want to know what nature does and produces.[24]

Each country and each region with its specific local circumstances showed a different flora and fauna which had to be thoroughly explored and described by naturalists in order to add new insights to the discipline of Natural History which he defined as follows:

> Natural History aims at collecting, knowing and describing all animals, plants and minerals available around the globe, and giving others the possibility to learn more about these specimens, and the spread of the usefulness which might emerge from it.[25]

In the years to come, Reinwardt's aspirations to travel the world to study nature remained rhetorical. As a member of the agricultural committee for

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[24] C.G.C. Reinwardt, "Redevoering over de onwederstaanbaare drift, met welke de beoëffenaars der natuurlijke historie, en vooral der kruidkunde, tot hunne studie aangezet worden," *Vaderlandsch magazijn van wetenschap, kunsten en smaak* (1803): 821: "[D]e natuur toch deelt hare godspraken niet overal uit, waar de raad vragende zulks mogt begeren. Haar tempel is de geheele aardbol, zo ver die uitstrekt; dezen behooren de natuuronderzoekers overal te doorkruisen, willen zij weten wat de natuur doet of voortbrengt."

[25] Ibidem, 825: "De Natuurlijke Historie heeft ten oogmerk, het verzamelen, kennen en beschrijven van alle op den aardbol aanwezige, dieren, planten en mijnstoffen, het geven van gelegenheid aan anderen om deze voorwerpen te leeren kennen, en het gemeen maken der nuttigheden, die daaruit kunnen ontstaan."

Gelderland, he had to restrict himself to the limited geographical boundaries of the department.

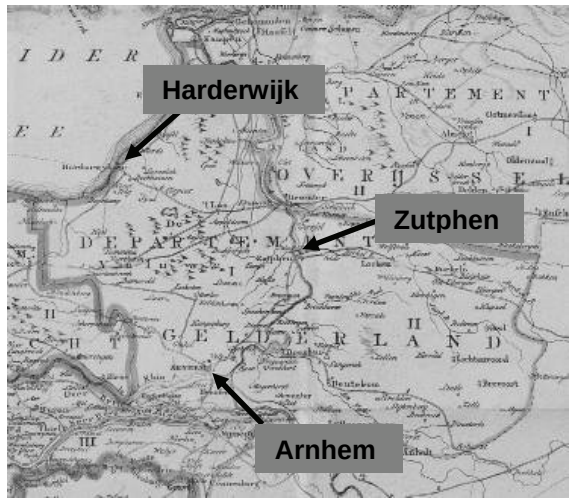

Figure 10: Map of department Gelderland with Harderwijk, Zutphen and Arnhem marked. The Committee for Agriculture held their regular meetings either in Zutphen or Arnhem.

The Gelderland committee consisted in total of eleven members. Some of these men owned large tracts of land and splendid houses. Beside Reinwardt, the administrators of the Batavian Republic engaged the secretary of the city council in Nijmegen Adriaan de Beyer (1773-1843), the owner of an agricultural enterprise in Heerderdal and not long afterwards Governor General of the Netherlands Indies, Herman Willem Daendels (1762-1818), the poet and agricultural 'oeconomist' Antoni Christiaan Wijnand Staring van den Wildenborch (1767-1840), the jurist Herman Jacob Dijckmeester (1771-1850), and the landowners Godefridus F. Hugenpoth tot Aerdt (1743-1819), Frans Godart van Lynden van Hemmen (1761-1845), Arnold Hendrik van Markel Brouwer (1771-1826) and Johan Frederik Willem Spaen tot Biljoen (1746-1827), a former Orangist who presided over the committee. Reinwardt was appointed as temporary secretary of the group.[26]

[26] Bataafsche Staatscourant 35 (1805), 4 November, 1 and GA Arnhem, Commissie van landbouw in Gelderland, 1. Verbaal van het verhandelde van de commissie van Landbouw in het departement Gelderland, eerste zitting, Arnhem, 20 November 1805. For a more detailed analysis of Staring, see H.B. Demoed, "De landbouwkundige activiteiten van A.C.W. Staring," in *A.C.W. Staring. Dichter en landman. Regionalist en nationalist,* ed. J.C. Boogman, 170-89 (Zutphen: Walburg Pers, 1990).

The brief list shows that it was in particular their socio-economic position and their communal allegiance to 'oeconomie' which held the rather diverse group together.

Figure 11: View of Antoni Christiaan Wijnand Staring van den Wildenborch's castle (late 1820s).

The Gelderland committee was a very active group. Already in July 1805, they handed in a long report on agriculture in the province. In their report they welcomed the initiative of the central government in The Hague and emphasized the importance of an efficient domestic agriculture and of processing industries after the Dutch defeat in the Fourth Anglo-Dutch War (1780-84).[27] In order to improve the agricultural situation in the province Gelderland they proposed a broad set of measurements ranging from the abolition of domestic taxes, the economic usage of water and the better exploitation of infertile lands.[28] To support their claim, they referred to the work of British and Prussian 'oeconomists' and geographers such as Anton Friedrich Büsching (1724-1793) and William Tatham (1752-1819).[29]

Büsching, a professor of theology and philosophy at the Georg Augusta University in Göttingen, was the author of various journals and monographs in which he illustrated how statistical and geographical surveys

[27] J. Kops, *Magazijn van vaderlandschen landbouw* 3 (1807): 53.
[28] Ibidem, 32-33.
[29] Ibidem, 42-43, 48.

could improve the economy of a country.[30] Tatham had written a monograph on the economic usage of water for agriculture and commerce. The monograph which came off the press in London in 1801 carried the telling title, *National irrigation, or the various methods of watering meadows; affording means to increase the population, wealth and revenue of the kingdom by an agricultural, commercial and general economy in the use of water.* During the winter months in particular, farmers in Gelderland faced problems controlling water on their corn fields.[31]

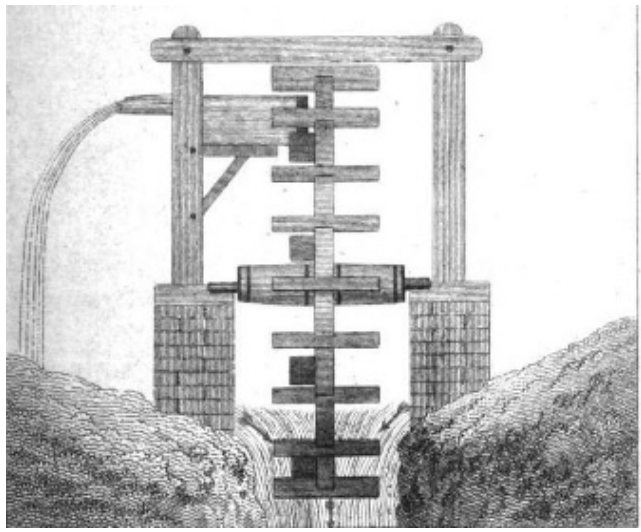

Figure 12: Frontal view of a lifting wheel in Tatham's monograph on the economic usage of water published in 1801.

In April 1806, the heads of the provincial agricultural committees came together in The Hague for the first time. The committees in Groningen, Drenthe, and Brabant had developed a first draft for a veterinary school in their provinces, while the Gelderland committee focused its attention on the taxation of land and the containment of harmful insects and

[30] For a detailed but not well reflected biography of Büsching see P. Hoffmann, *Anton Friedrich Büsching (1724-1793). Ein Leben im Zeitalter der Aufklärung* (Berlin: Berlin Verlag A. Spitz, 2000).

[31] J. Kops, *Magazijn van vaderlandschen landbouw* 4 (1808): 246-48.

worms in their province. Reinwardt and plant expert Adriaan De Beyer (1773-1843) also prepared a longer report on the latter issue.[32]

Reinwardt's and De Beyer's report illustrates the inextricable relationship between 'natural historical' inquiry and the various efforts to improve the administration of the Batavian Republic. In their report, Reinwardt and De Beyer first gave a general overview of the different sorts of bugs and worms that affected agriculture. To get a clearer picture, they advised the members of the different departmental committees to observe and survey the appearance of these vermin in their districts. Such local surveys would contribute to this important part of the department's natural history and it would allow people to learn more about the necessary measurements that had to be applied in case of an unforeseen infestations.[33]

In May 1807, the heads of the departmental committees gathered again in The Hague. One of the central topics during this meeting was the cultivation and exploration of infertile land. The Gelderland committee had submitted a long report dealing with that issue. To proceed with the reorganization and improvement of such areas in their province, the members emphasized the importance of an exact survey comprising all kinds of statistical, geographical, and geological data, to which end they had developed their own questionnaire.[34] . Their survey was finished within a short period of time, and in the same year the committee handed in a long report which comprised at least part of the requested information. Reinwardt contributed brief agricultural surveys of the districts of Harderwijk, Scholt-Ambt van Ermelo, Putten, Nijkerk and Barneveld, all of which were situated in the western part of Gelderland.[35]

The reports and observations of the Gelderland committee and its local collaborators formed the basis of a national report on the current state of agriculture in the Batavian Republic. The first was published in the 1806 issue of the Journal of Domestic Agriculture (*Magazijn van vaderlandschen*

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[32] GA Arnhem, Commissie van landbouw in Gelderland, 1. Verbaal van het verhandelde van de commissie van landbouw in het departement Gelderland, tweede zitting, Arnhem, 3 February 1806.

[33] GA Arnhem, Commissie van landbouw in Gelderland, 1. Verbaal van het verhandelde van de commissie van landbouw in het departement Gelderland, dertiende zitting, Arnhem, 19 May 1807, no. 121.

[34] J. Kops, *Magazijn van vaderlandschen landbouw* 4 (1808): 58-99.

[35] Ibidem, 5 (1810): 27 and GA Arnhem, Commissie van landbouw in Gelderland, 1. Verbaal van het verhandelde van de commissie van landbouw in het departement Gelderland, achtentwintigste zitting, 10 August 1808.

landbouw). The report was divided into three parts. The first section summarized data on environ-mental factors such as temperature, the seasons, wind, rain, and humidity. The second dealt with the cultivation and current state of various crops, such as coleseed, barley, rye, wheat, oat, beans, peas, potatoes. This section also included information on agricultural products such as flax, hemp, tobacco, madder, hop, different sorts of cabbage, vegetables, fruit trees, forest trees, hedges. The third and final section comprised data on pasture lands, the dunes, livestock such as cattle, pigs and cattle, bees, fodder crops, vermin, drainage, veterinary diseases and new products such as wheat with multiple ears, Egyptian barley, and Chinese radish seeds.[36]

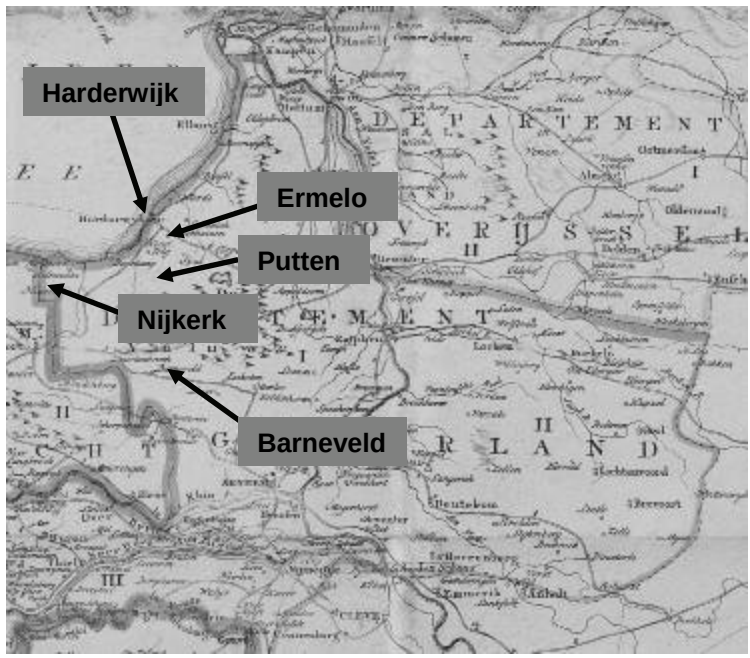

Figure 13: Reinwardt's collecting places in the department Gelderland.

A brief analysis of Reinwardt's botanical activities in Harderwijk has revealed a strong overlap between his claims and practices as an academic in Harderwijk and his function as agricultural surveyor in the department Gelderland. In both realms, Reinwardt observed, described and collected economically useful and medicinal plants and provided data on

[36] J. Kops, *Magazijn van vaderlandschen landbouw* 4 (1808): 249-327.

environmental factors, for all departmental reports which had to be submitted to The Hague had to comprise sections on quantifiable environmental parameters such as weather, humidity, and temperature.

A National Botanical Manual: The *Flora Batava*

Considering what has already been said, it is not surprising that Reinwardt also became involved in another 'useful' project which the commissioner for agriculture Kops had launched in 1800, the so-called *Flora Batava*.[37] In the *Flora Batava,* Kops sought to provide an overview of all the flora in the *Batavian Republic.* Kop's plant descriptions were enriched by illustrations and practical information on the cultivation of edible and other useful plants. In the introduction of the *Flora, Kops* emphasized the usefulness of the botanical compendium, for, as he wrote, it would allow apothecaries, medical doctors, farmers and others to distinguish and identify useful plants in the field. To increase the book's utility and accessibility, all descriptions were written in Dutch and in French. Moreover, the book aimed at standardizing the local nomenclature of plants, or as Kops put it:

> In order to make this study as useful as possible for Dutchmen, I tried my best to settle all confusion regarding Dutch names of domestic plants. Well known and common plants have different names in the various districts of our Republic (*gemeenbeest*) which makes it difficult to refer and point someone to a certain plant in Dutch. It would be highly desirable if each domestic plant carried only one name used in the entire Republic. . . . In this respect, our nation lacks a general language everybody understands: one is thus deprived of all the beneficial effects which emerge by exchanging such expertise.[38]

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[37] For a detailed history of the *Flora Batava* see: M. van Delft, "De 'Flora Batava': het eerste overzicht van de Nederlandse wilde planten in word én beeld," *Jaarboek van het Nederlands Genootschap van Bibliofielen* 6 (1998): 115-143.

[38] J. Kops, *Flora Batava*, vol. 1 (Amsterdam: J.C. Sepp en Zoon, 1800), 2: "Om dit werk voor den Nederlander van het meeste nut te doen zijn, wenschte ik zo veel moogelyk de verwarring wegteneemen, die omtrent de Nederduitsche Naamen onzer Inlandsche Planten overal plaats vindt. De meest bekende en gebruikelijke Planten, hebben in de verschillende oorden en plaatsen van ons Gemeenbest zeer onderscheide benaamingen,

The standardization of indigenous plant names would allow the identification of toxic as well as useful plants. Kops therefore decided to assign only one Dutch name for each plant in the hope that it would be used from that moment onwards.[39]

Figure 14: Portrait of Jan Kops after his appointment as professor for agricultural economy at the University of Utrecht.

In the foreword of the second volume of the *Flora Batava*, published in 1807, Kops thanked various individuals from Nijmegen, Zutphen, Tholen, Rotterdam, Drenthe, and Utrecht who had shared with him their field notes and their knowledge about useful and medicinal plants. Among the contributors one finds provincial administrators, landowners and students.[40] Reinwardt, who at that time had already been appointed as professor of

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waar door het zo moeilyk valt, eene Plant in het Nederduitsch aan anderen kennelijk optegeeven.—Hoogstwenschelijk ware het, dat elke Inlandsche Plant slechts eene Nederduitsche benaming hadt over de geheele Republiek. . . . Onzer Natie ontbreekt in dit opzicht eene algemeene taal, waarin men zich bij ieder kan doen verstaan: men is dus verstooken van alle de heilzame gevolgen, in zijne gevoelens en kundigheden hiervoor aan anderen mededetedeelen."

[39] Ibidem.

[40] Ibidem, vol. 2 (Amsterdam: J.C. Sepp en Zoon, 1807), 1-2.

chemistry, natural history and botany at the Athenaeum Illustre in Amsterdam, is mentioned in the foreword of the third volume. Reinwardt's contribution was twofold. He had translated the Dutch descriptions of plants into French, and he had compiled information on the medical usage of the plants described in the volume. For as Kops put it, his expertise in that field was widely recognized and praised.[41]

Improving Medical Supervision in Gelderland

In addition to his work as agricultural surveyor and contributor to the *Flora Batava*, Reinwardt also became involved with the Departmental Committee for Medical Supervision.[42] As defined in an ordinance of 1804, the tasks of the regional committees were wide-ranging. The members had to control the medical expertise of apothecaries, midwives and surgeons and to survey their daily medical practice. Moreover, they had to inspect the shops of apothecaries and practices of surgeons twice a year. In particular, unexamined practitioners were severely punished. If they were caught they had to pay a penalty fee and had to hand in all their drugs, instruments, and other medical equipment. A second and third violation of the regulations would bring them a confinement of six months, corporal punishment or, even worse, they might be exiled from the Batavian Republic.[43]

The Gelderland committee, which gathered in Arnhem four times a year, consisted of in total twelve members who worked as academics, medical doctors, surgeons, public lecturers and apothecaries in various parts of the department. The committee was presided over by Nicolaas van Lookeren who, after studying in Utrecht, had established himself as a physician in his birthplace, Tiel.[44] Other members, for instance, were Jacob Kopp, Pieter Jacob van Maanen, Johannes van Munster, Gerrit Jan van Wy, Isaac de Bruijn, Otto de Ruuk, Simeon Beverlij Heereford, and J. van Tekelenburg. Kopp had studied medicine in Duisburg and was employed as chief

[41] Ibidem, vol. 3 (Amsterdam: J.C. Sepp en Zoon, 1814), 1.

[42] On the establishment of the Gelderland committee for medical supervision, see J.K. van der Korst, "Gelders verzet tegen de Bataafse gezondheidszorg, 1801-1806," in *Gelre. Bijdragen en mededelingen* 64 (1976/1977): 189-216 and more general A. Querido, *Een eeuw staatstoezicht op de volksgezondheid* ('s-Gravenhage: Staatsuitgeverij, 1965).

[43] D. Cannegieter, *Hondertvijftig jaar gezondheidswet* (Assen: Van Gorcum & Comp N.V.—G.A. Hak & Dr. H.J. Prakke, 1954), 27-30.

[44] On Van Lookeren, see H. van Roijen, "Berigten," *Algemene konst- en letterbode* 29 (1833): 449-56.

physician (*archiater)* in the department Gelderland. Van Maanen was one of Reinwardt's colleagues. Since 1795, he held a professorship for medicine, anatomy and obstetrics at the University of Harderwijk.[45] Van Munster had settled as surgeon and obstetrician in Nijmegen.[46] Trained as a surgeon in Amsterdam, Van Wy held a position as municipal lecturer for medicine, anatomy and obstetrics in Arnhem in 1788.[47] De Bruijn and Beverlij Heereford practiced as physicians in Zutphen and Arnhem.

The Gelderland committee convened in Arnhem for the first time at the end of April 1806. At the first gathering, Reinwardt was asked to develop a plan regarding the examination of apothecaries, surgeons and midwives in the department. The new regulations which Reinwardt developed in the following months were eventually discussed at a second meeting. According to the new rules which were promulgated at the end of this meeting, every apothecary, surgeon or midwife who wanted to settle in Gelderland had to prove that he or she possessed sufficient theoretical and practical skills in his respective profession. New practitioners had to demonstrate their abilities in the form of an examination, to be held in Arnhem four times a year. During the examination, surgeons had to prove that they had worked six years as apprentices and that they were able to carry out difficult operations on living and dead bodies. Midwives had to demonstrate they had attended practical courses and that they had three years of practical experience. Reinwardt, Van Lookeren and Koops were responsible for the examination of apothecaries. Important elements of their examination were their pharmaceutical expertise and their command of Latin. Since the venue where the Gelderland committee met did not possess a chemical laboratory, the apothecaries had to do chemical-pharmaceutical preparations at their own workplace on the day before the exam. Every apothecary, surgeon and midwife who passed the examination eventually received a diploma granting him the right to settle and work in the department Gelderland.[48]

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[45] On Van Maanen, see A. van der Boon, "Levensberigt van Pieter Jacob van Maanen," *Jaarboek van de Maatschappij der Nederlandse Letterkunde* (1855): 40-61.

[46] Anonymous, "Johannes van Munster," in *Biographisch woordenboek der Nederlanden*, vol. 12, part 2, ed. K.J.R. van Harderwijk et. al., 1156-57 (Haarlem: J.J. van Brederode, 1869).

[47] S. Thomas, "*Gerrit Jan van Wy," in Nieuw Nederlandsch biografisch woordenboek*, vol 3, part 3, ed. P.C. Molhuysen, 1493-94 (Leiden: A.W. Sijthoff's Uitgeversmaatschappij, 1914).

[48] GA Arnhem, Archieven van de geneeskundige commissieën in Gelderland. Ordinaire vergadering, 28 and 29 May 1806.

The preceding paragraphs have shown that Reinwardt played a leading role in the committee. He had been asked to develop a new set of rules to improve the examination of future apothecaries, surgeons and midwives right after its establishment. As in other parts of the Batavian Republic, the new rules had a strong empirical component. In particular apothecaries had to demonstrate that they were able to handle various measuring instruments and other chemical hardware to guarantee the quality of the drugs they produced.

Promoting Chemistry in Harderwijk

Considering Reinwardt's emphasis on laboratory training, it is not surprising that he also used the University of Harderwijk as platform to promote such an approach. In the lecture given upon his resignation as university chancellor in 1803, Reinwardt promised his academic audience that an chemistry would help to advance not only public health care but also agriculture, economy and society in the Batavian Republic.

To illustrate and strengthen his claim, Reinwardt distinguished two forms of chemistry: an old form and a new one. While practitioners of the old chemistry, as Reinwardt put it, had only developed rudimentary tools and techniques to analyze and harness nature to various useful ends, 'new' chemists such as the German chemist Georg Stahl (1659-1734), the British physiologists Stephan Hales (1677-1761) and John Mayow (1640-1679), the Scottish physician Joseph Black (1728-1799), the natural philosopher and theologian Joseph Priestly (1733-1804), and the French aristocrat Antoine-Laurent Lavoisier had shifted their analytical focus to an analysis of the reasons underlying natural phenomena. To unravel the hidden forces of nature, these 'new' chemists had instead developed and applied a wide variety of instruments and apparatuses to measure, weigh, analyze, process, split, distil and unite various natural elements such as water, minerals, and gases in their laboratories.[49] Since the intensive usage of instruments allowed them to transcend the limitations of the human senses, the 'new' chemistry would thus, according to Reinwardt, allow to open up entire new fields of natural inquiry.[50]

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[49] Reinwardt, "Redevoering, over de voortreffelijkheid," 191.

[50] The origin and wider implications of the gradual shift from sensual perceptions towards 'exact' measurement within the field chemistry in the decennia around 1800 are discussed in L. Roberts, "The death of the sensuous chemist: the 'new' chemistry and the

Like the French chemist Joseph Louis Gay-Lussac (1778-1850) and his German colleague and friend Alexander von Humboldt, Reinwardt now argued that the application of measurement instruments in the field would allow the formulation of more general laws of nature.[51] In particular, the exact analysis of the composition of metals, stones and soils in the field could shed more light on how the various forces of nature such as wind, water, air and fire had shaped the physical appearance of living things in a certain territory. And, Reinwardt added, among the more promising sites where such an analysis could be carried out were volcanoes—he calls them underground 'fireplaces'—for they continuously affected nature at the earth's surface. Travelling and measuring naturalists thus had the potential, according to Reinwardt, to develop an entirely new and much more holistic vision of nature which was not restricted to raw, ponderous (*log*) and dead nature. By analyzing animals and plants in their natural environment, the 'new' chemistry would rather allow to unravel the deeper causes, interconnections and harmony of nature.[52]

The topics Reinwardt raised in his lecture were not new. French naturalists such as Georges-Louis Leclerc de Buffon (1707-1784), director of the Jardin du Roi in Paris, and Louis Jean-Marie Daubenton (1716-1799) had investigated the impact of environmental factors on plants and animals in their popular work *Histoire naturelle, générale et particulière* (1749-1787). Especially in the years before the French Revolution, theories about the relationship between nature, culture and climate had gained new weight.[53]

During Reinwardt's years in Harderwijk, this rather ambitious agenda remained mere rhetoric. For want of personal funds or a wealthy sponsor, Reinwardt had to limit himself to Harderwijk and the near environs. The only journeys he could afford were within Gelderland or to Amsterdam or Haarlem. In March 1806, he, for instance, informed the head of the

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transformation of sensuous technology," *Studies in the history and philosophy of science* 26:4 (1995): 503-29.

[51] For one of the rare accounts that sheds light Von Humboldt's early interest in chemistry and measuring devices, see P. Werner, *Himmel und Erde. Alexander von Humboldt und sein Kosmos* (Berlin: Akademie Verlag, 2004), 72-88 and more recently: Klein, "The Prussian mining official Alexander von Humboldt".

[52] Reinwardt, "Redevoering, over de voortreffelijkheid," 200.

[53] For an in-depth survey of all these earlier debates, see M.J.S. Rudwick, *Bursting limits of time. The reconstruction of geohistory in the age of revolution* (Chicago: University of Chicago Press, 2005), chapter 3 and Spary, *Utopia's garden,* chapter 3.

Committee for Agriculture that he would not be able to attend the next meeting because of a short sojourn in Amsterdam.[54]

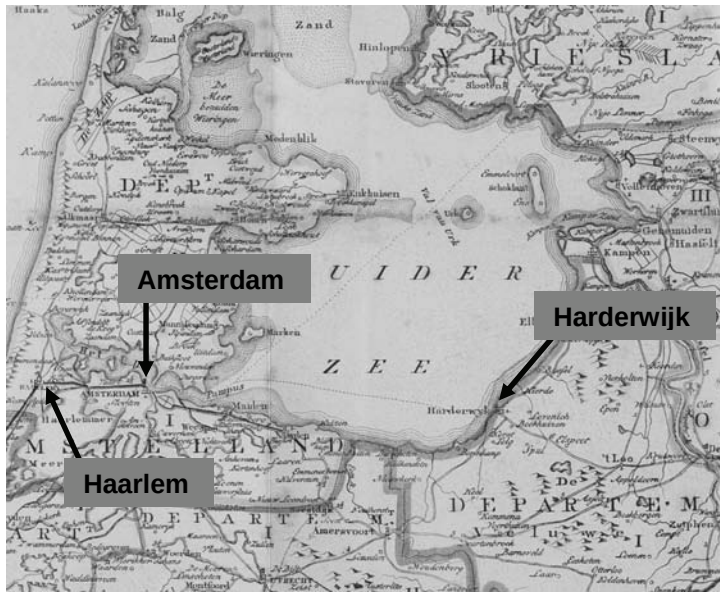

Figure 15: Map of the region between Amsterdam, Haarlem and Harderwijk. Harderwijk and Amsterdam were linked by a direct ship connection.

Reinwardt used such short trips to stay in touch with his brother and old friends, though he sometimes took the opportunity to lecture. In 1803 and 1804, he gave two lectures on chemistry at Concordia et Libertate. In the first, he explained how knowledge of the earth's atmosphere could be used to improve chemical processes in an industrial context. In his second talk, Reinwardt speculated about geological changes of the earth crust.[55]

[54] GA Arnhem, Commissie van landbouw in Gelderland, 1. Verbaal van het verhandelde van de commissie van landbouw in het departement Gelderland, dertiende zitting, Arnhem, 13 March 1806.

[55] The full titles of Reinwardt's lectures were: *Over de invloed onzer tegenwoordige kennis van de dampkring op de voornaamste verschijnselen der natuur en op die menselijke kunstverrichtingen die hieruit alleen kunnen en moeten worden verklaard* (1803) and *Enige gedenkstukken van de ouderdom der aarde en de verbaazende omwentelingen die aan haar tegenwoordige gesteldheid moeten zijn voorafgegaan* (1804).

While a few of his former learned companions now worked on their careers as lawyers, politicians, physicians and academics, many of his apothecary friends faced a sombre future. The majority of them had had to close their small chemical companies, for with the liquidation of the Dutch East India Company in 1800, Amsterdam gradually lost its place as the central 'staple' market in Europe.

In the years to come, Reinwardt thus focused his attention on teaching chemistry and botany to future physicians and apothecaries at the University of Harderwijk. One of the central teaching places was the laboratory, for as he put it in his inaugural lecture, "chemistry does not teach through words but through experiments."[56] The following two sections will shed more light on his teaching practices in Harderwijk, and they will illustrate how his instrument- and experiment-based chemistry gained greater acceptance among apothecaries and academically trained chemists.

Teaching Chemistry in Harderwijk

Unfortunately only a few traces of Reinwardt's teaching practices in Harderwijk remain. What we know for certain is that the laboratory was constantly enlarged and modernized during his tenure so that his students could watch him carrying out experiments with different measuring instruments and other hardware.[57] Though we cannot be certain, it seems likely that his students were also allowed to use the laboratory after the lectures to improve their experimental skills.

According to an inventory made up in 1812, less than four years after Reinwardt had left the university, the laboratory comprised various apparatuses and measuring devices such as a big board displaying the relationships of chemical elements, 24 retorts, 16 flasks, straight and bent tubes, 2 tin pneumatic bins, a distilling vessel (*desteleerketel*), an old oven, a stove (in Boerhaave style), 2 iron pots, 2 dripstones (*leksteenen*), a sprayer (made by the Haarlem physician Martinus van Marum), an anvil, a mortar and pestle, a water fountain, a heater with tubes (*kachel met pijpen*), a set of Florentine oil glasses and white sugar glasses, 4 apothecary bottles, 2 copper

[56] Reinwardt, "Redevoering, over de voortreffelijkheid," 198: "[Z]ij [de scheikunde] onderwijst niet door woorden, maar door proeven."

[57] J.J. Meinsma, "Het scheikundig onderwijs aan de Gelderse Hogeschool (1648-1811) en Rijksathenaeum (1815-1818) te Harderwijk," *Scientiarum historia* 14 (1972): 211-12 and De Vriese, *Reinwardt's reis*, 16.

pans, a set of drugs, 204 bottles with chemicals, a big green bottle with potash, a set of ammonium chloride (*salmiak*) and black manganese (*bruinsteen*), an eudiometer made by the Italian instrument maker Felice Fontana (1730-1805), a smelting machine (*smeltmachine*) by Erhard, a gas machine by Parker, a bell jar with copper spigot, a bottle by Priestly, a new tin helmet, a hammer, a hygrometer scale (*hygrometer schaal*), and a garden house with stove and tubes.[58] In addition, the university owned a long list of physical instruments such as a table air pump, an electrical machine including a Leyden conductor jar, a steelyard, a machine for hydrostatical proofs designed by Willem Jacob 's Gravesande (1688-1742), a hygrometer with strings (*hygrometer van snaren*) and one made of glass, a galvanic pilar (*colom*) with copper and zinc plates.[59]

Following a Disciple: Jacob Vosmaer (1783-1824)

Another source of information about Reinwardt's teaching practices is his disciple Jacob Vosmaer (1783-1824), whom he considered one of his best chemistry students.[60] A brief analysis of Vosmaer's career sheds more light on how Reinwardt taught chemistry in Harderwijk.

Finished a doctoral thesis in the field of chemistry, Vosmaer first settled as a physician in Haarlem and moved later to Zutphen. In 1816, he was appointed professor of chemistry, botany and pharmacology at the University of Harderwijk It is rather likely that Reinwardt recommended him to the university's curators. Later Vosmaer received a similar position in Utrecht.[61]

In 1822, Vosmaer published a handbook for apothecaries with the rather long title: Apothecary's dictionary, or extended overview of pharmaceutical art and all other related sciences, in alphabetical order (*Apothekers woordenboek, of uitvoerig zamenstel der apothekerkunst en daartoe voorbereidende wetenschappen, in eene alphabetische orde*). Vosmaer dedicated

[58] O.C.D. Idenburg-Siegenbeek van Heukelom, "De laatste jaren der hoogeschool van Harderwijk," *Gelre. Bijdragen en mededeelingen* 37 (1934): 262-63.
[59] Ibidem, 260-62.
[60] For Reinwardt's judgment, see MM The Hague, letter Reinwardt to Meerman, 12 October 1809.
[61] For a short biography of Vosmaer, see H.J. Schimmel, "Jacob Vosmaer," in *Nieuw Nederlandsch Biografisch Woordenboek*, vol. 3, ed. P.C. Molhuysen et al., 1352. Leiden: A.W. Sijthoff's Uitgevers-Maatschappij, 1914 and Meinsma, "Het Scheikundig onderwijs," 214-15.

the book to his teacher Reinwardt. To increase the usefulness of the book he had chosen to order the material in the form of a dictionary. For apothecaries, as he put it,

> by reason of their profession only seldom have the chance to reserve considerable parts of the [working] day explicitly for scientific exercises. For them it is thus more preferable and pleasant to read loose parts than a long concatenated, systematic work whose lecture is repeatedly interrupted by other practical occupations.[62]

Figure 16: Portrait Jacob Vosmaer (1783-1824).

[62] J. Vosmaer, Apothekers woordenboek, of uitvoerig zamenstel der apothekerkunst en daartoe voorbereidende wetenschappen, in eene alphabetische orde. Eerste deel (Zutphen: H.C.A. Thieme, 1822), VIII: "[u]it hoofde van den aard van hun beroep, zelden gelegenheid [hebben], om een aanmerkelijk gedeelte van den dag bepaald tot wetenschappelijke oefeningen af te zonderen. Dit maakt hun het lezen van losse stukken verkieselijker en aangenamer, dan dat van een aaneengeschakeld, systematisch werk, waarvan de lectuur telkens, door allerlei bezigheden wordt afgebroken."

The dictionary thus contained various articles on instruments, pharmaceutical treatments, acids, plants, and even an outline of how pharmacies had to be organized. The articles on 'apothecary' and 'pharmaceutics' (*apothekerskunst*) offer good insight into the self-image of apothecaries and chemists at the time. According to Vosmaer, apothecaries played three different roles: they acted as merchant, civil servant (*staatsbeamte*) and as learned man (*geleerde*). In their function as merchant, apothecaries had to possess enough economic knowledge to manage and organize their small companies. As civil servants, they were bound by the national and provincial decrees and laws according by which the profession was organized. Finally, as learned men apothecaries had to be informed about the latest developments in the fields of botany and chemistry. For the production of drugs required them not only to identify and collect plants in the field but also to separate and combine the active pharmaceutical ingredients of those plants by treating them chemically. Not unlike his teacher Reinwardt, Vosmaer stressed the intimate relationship between chemistry and botany as follows:

> The acquisition of necessary stock induces him again and again to examine a large variety of specimens of nature, in particular plants, from different perspectives; and while preparing and purifying drugs, his workplace continuously lets him face phenomena which invite and sometimes even require him to carry out chemical research.[63]

In the article on the art of producing drugs *(apothekerskunst)*, Vosmaer further specified his view on the profession. Although nature would deliver a large variety of medical plants, only well-trained apothecaries were able to harness the medicinal forces of plants to various useful ends. The ability to control these forces had to be seen as the founding principle of the profession, for "it is only through forces which lay in nature that he can practise his art."[64]

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[63] Ibidem, 159: "De verzameling van zijnen noodigen winkelvooraad geeft hem telkens aanleiding, om allerlei voorwerpen der Natuur, in het bijzonder gewassen, uit allerlei oogpunten te beschouwen; en zijne werkplaats levert hem, bij de bereiding en zuivering der geneesmiddelen, onophoudelijk verschijnselen op, welke hem tot scheikundig onderzoek noodigen, en somtijds zelfs noodzaken."

[64] Ibidem, 160: "[h]et is door de krachten, welke in de natuur liggen, alleen dat hij zijne kunst kan uitoefenen."

In subsequent sections, Vosmaer developed a whole curriculum of competences and practices apothecaries needed to acquire during their training. First of all, apothecaries had to learn to identify and distinguish all natural specimens being found in the wild. Most important were the realms of plants and minerals, for in these apothecaries would find the most important medical ingredients. Moreover, apprentices had to understand the complex chemical relationship and interaction between solids, liquids and gases in order to understand the phenomena which they encountered in their daily work in the laboratory. Vosmaer put it as follows:

> Further he has to understand the underlying relationship and functioning of the elements (*lichamen*), and the forces on which they depend, in order to be able to grasp/comprehend the manifold phenomena which he observes every day and to harness them for his specific art. He will obtain this knowledge through *physics* and *chemistry.*[65]

Beside botanical and chemical expertise, new apprentices had to learn how to apply the knowledge in practice. In order to collect medical plants in the field efficiently, apothecaries had to be able to recognize toxic plants, which often resembled non-toxic variants. Knowledge about the external characteristics of plants was thus obligatory. Moreover, apothecaries had to be informed about the best time to collect different plants, the sites where certain plants could be found and the methods for digging and cutting up plants. Roots for instance had to be harvested in a different way and at a different time of the day than flowers. Another important factor which had to be taken into account was soil, for

> Some crops are most functional on dry soil, others on humid; some in the open field, others if they grow in the shade. For some it is necessary that they occur in the wild

[65] Ibidem, 160-61: "Vervolgens moet hij de onderlinge betrekkingen en werking der lichamen, en de eigenschappen en krachten, waarvan dezelven afhangen, verstaan, om de veelvuldige verschijnselen, welke hij, bij zijne werkzaamheden, dagelijks waarneemt, te begrijpen, en om daarvan, voor zijne kunst, partij te kunnen trekken. Deze kennis zal hij door de Natuur- en Scheikunde verkrijgen."

> and are not artificially cultivated, for others it does not matter or is even much better.[66]

Vosmaer's dictionary was well received by its readers. In the 1823 edition of the National Literary Exercises *Vaderlandsche letteroefeningen* Vosmaer's work was praised for its impartiality and completeness. The extensive list of references to German and French chemical and botanical literature particularly impressed one of his anonymous reviewers.[67] Another reviewer who wrote a short piece for another infuential periodical (*Algemene konst- en letterbode*) came to the same conclusion but thought that the book went beyond the needs of normal apothecaries. The articles on arsenic, vinegar and benzene acids (*benzoezuur*), he maintained, included chemical information more appropriate to the scientific discipline of chemistry than to the more utilitarian practices of apothecaries.[68]

Conclusion

This chapter has shown how Reinwardt became gradually involved in the various surveying and improving endeavours of the new Batavian administrators. As a member of the Committee for Agriculture he carried out field surveys and advised farmers about how to cultivate their lands efficiently. As a member of the Departmental Committee for Medical Supervision, Reinwardt examined the practical skills of apothecaries. As an academic in Harderwijk he instructed his students in the use of measuring devices and other chemical hardware for various useful ends. And he helped one of the central figures in the new administration, Jan Kops, to finish the third volume of his *Flora Batava*, a practical botanical manual for farmers, apothecaries and other plant experts.

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[66] Ibidem, 161: "[s]ommige gewassen zijn het werkzaamst op drooge gronden gegroeid, andere op vochtige; sommige in het open veld, andere als zij in de schaduw staan. Van dezen is het noodzakelijk, dat zij in het wild voortkomen en niet door kunst geteeld zijn, bij genen is dit onverschillig of zelfs wel beter."

[67] Anonymous, review of *Apothekers Woordenboek of uitvoerig zamenstel der apothekerkunst en daartoe voorbereidende wetenschappen* by J. Vosmaer, *Vaderlandsche letteroefeningen* (1823): 596-99.

[68] Anonymous, review of *Apothekers Woordenboek of uitvoerig zamenstel der apothekerskunst en daartoe voorbereidende wetenschappen* by J. Vosmaer, *Algemene konst- en letterbode* 38 (1822): 183-88.

His new status as administrator allowed Reinwardt to cloak himself in a new identity which he developed in the course of two lectures held at the University of Harderwijk. In the first, Reinwardt staged himself as fearless traveller who dared to explore nature in the field for the benefit of the economy, society and agriculture of the Batavian Republic. In the second lecture, he placed himself in a long line of French, German and British chemists who, working in their laboratories, had developed and applied a series of measuring devices to various useful ends. Like naturalists in France and Germany, Reinwardt now hoped that the application of these measuring devices in wild nature would allow scientists to shed light on more general mechanisms and laws that had shaped and still shaped nature and, more particular, agriculture in in the Batavian Republic.

The analysis reveals a strong overlap between the realms of governance and science. Figures such as Reinwardt, Kops and Goldberg drew upon similar practices to gain 'reliable' knowledge about the natural resources of the Batavian Republic. While Kops and Goldberg preferred questionnaires and 'oeconomic' journeys as tools to accumulate such knowledge, Reinwardt considered the application of measuring instruments as an essential means of enriching the 'oeconomic' understanding of nature in the Batavian Republic. The increasing acceptance of *travelling*, *measuring* and *observing* as linked tools thus formed an important step towards the 'well-ordered' and 'well-surveyed' nation state as it emerged in the course of the nineteenth century.

Reinwardt's attempts to establish himself as a scientific and oeconomic traveller received a major twist in June 1808. After Louis Napoleon Bonaparte (1778-1846), king of the Netherlands since 1806, had visited the University of Harderwijk and seen its garden and the chemical laboratory, he decided to engage Reinwardt with immediate effect as director of a royal botanical garden and a menagerie to be established in the vicinity of his royal domain of Soestdijk in Baarn, not far from Utrecht. Reinwardt would receive an annual income of 3000 guilders for his new position as royal gardener, 2000 guilders more than he had earned as professor in Harderwijk.[69] Reinwardt must have been pleased about the new appointment, for he knew that in the second half of the eighteenth century, the Jardin des Plantes (among others around Europe) had served many naturalists as one of

[69] UB Leiden, BPL 2425, 3, Royal decision, 28 June 1808.

the few platforms from which to launch their careers in the field.[70] The following chapter will show that for Reinwardt, the Dutch Jardin du Roi was a rather fragile starting point. Owing to the short reign of Louis Napoleon, Reinwardt had to find other ways to secure his status in a time of political and institutional instability.

[70] For a deeper analysis of the complexity of such careers in eighteenth century France, see E.C. Spary, "The 'nature' of enlightenment," in *The sciences in enlightened Europe*, ed. by William Clark, et al. 272-304 (Chicago: University of Chicago Press, 1999).

3

Sociability as a Vehicle for a Career

You know the odd, inexplicable inspiration which makes one return to botanical work.

Letter Reinwardt to Van Marum,
Batavia, 1 January 1817.[1]

When Reinwardt commenced his new position as director of the Jardin du Roi in 1808, the political situation was fragile in the Netherlands. In particular, the appointment of Louis Napoleon Bonaparte (1778-1846) as king of the Netherlands in the summer of 1806 had stirred tensions among the Batavian administrators. While his brother hoped that a strong French sovereign would guarantee the political integrity of the country, many Dutch patriots feared that the establishment of a 'monarchy' would endanger their republican ideals for which they had fought during the Batavian Revolution in 1795. Various pamphleteers and intellectuals such as Maria Aletta Hulshoff (1781-1846) and David Jacob van Lennep questioned the legitimacy of the new king and refused their allegiance. In order to secure his position, Louis Napoleon pursued a policy that aimed at reconciling patriots and Orangists under the banner of a 'constitutional' monarchy with him as a strong sovereign.[2]

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[1] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Batavia, 1 January 1817.

[2] Van der Burg, *Nederland onder Franse invloeden,* chapter 2.

A core part of this policy was the preparation of a new constitution, which was meant to cement the king's central role in the new monarchy above all other representative bodies. The complex history of the constitution illustrates how Louis Napoleon first balanced the different positions and then interfered in an effort to secure his central role in the new state.[3]

Figure 17: Portrait of Louis Napoleon Bonaparte (1778-1846).

Beside the new constitution, Louis Napoleon's government launched various projects to centralize and improve the country's public health care, legal system, infrastructure, agriculture, processing industry and education.[4] Moreover, he initiated the establishment and enlargement of splendid palaces, ample parks, a royal botanical garden, a menagerie, national art gallery and museums. In order to realize these prestigious projects he hired, among others, the French architect Jean-Thomas Thibault (1757-1826), his Dutch colleague Johan Ph. Posth (1763-1831), the landscape

[3] Van der Burg, "Transforming the Dutch Republic," 151-70.

[4] See Van der Burg, *Nederland onder Franse invloeden,* chapters 3-8. For an overview of a few infrastructural projects, see, for instance, W. Uitterhoeve, *Cornelis Kraijenhoff, 1758-1840. Een loopbaan onder vijf regeringsvormen* (Nijmegen: Vantilt, 2009), chapter 8.

architects Johan David Zocher sr. (1763-1817) and his son Johan David Zocher jr. (1791-1870).[5] Louis Napoleon hoped that such a policy would dispel all doubts among radical and moderate patriots and Orangists about a 'constitutional' monarchy with him as autocratic monarch.

As director of the new Jardin du Roi and the menagerie, Reinwardt became directly involved in one of these prestigious projects. While Louis Napoleon first considered his palace in Baarn a suitable venue for the royal garden, Reinwardt suggested that the king establish the new institutions in the park of his residency in Haarlem, Paviljoen Welgelegen. The soil and climate there offered an ideal natural environment for the acclimatization and cultivation of various exotic, medical and economic plants. Moreover, the proximity of Paviljoen Welgelegen to the capital Amsterdam would make it an attractive place for domestic and foreign visitors.[6] When Louis Napoleon's private physician Matthias van Geuns (1735-1817) confirmed Reinwardt's judgment, the king followed the advice and confirmed Haarlem as new venue.[7]

An analysis of Reinwardt's activities as director of the royal botanical garden and menagerie is presented in the first part of this chapter. The second part reconstructs his social activities in Haarlem and later in Amsterdam. Of particular importance was his friendship with Martinus van Marum, secretary of the Dutch Society of Sciences (Hollandsche Maatschappij der Wetenschappen) and director of Teyler's Museum, who helped advance his further career. Only with the support of Van Marum did Reinwardt receive access to these learned circles in Haarlem. Van Marum

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[5] P. Rem, "De paleizen van Lodewijk Napoleon en hun inrichting," in *Lodewijk Napoleon. Aan het hof van onze eerste koning, 1806-1810*, ed. Paul Rem, et al., 20-35 (Walburg Pers: Zutphen, 2006); Ben Groen, "De tuinen van Lodewijk Napoleon," in *Lodewijk Napoleon. Aan het hof van onze eerste koning, 1806-1810*, ed. Paul Rem, et al., 37-46 (Zutphen: Walburg Pers, 2006); J.G. Kikkert, *Louis Bonaparte (1778-1846). Koning van Holland* (Rotterdam: Donker, 1981), 58-68; and E. Koolhaas-Grosfeld, "Inleiding, Lodewijk Napoleon en de Nederlandse samenleving. Verwachtingen, plannen en projecten," in *Lodewijk Napoleon en de kunsten in het koninkrijk Holland,* ed. E. Koolhaas-Grosfeld, et al. (Zwolle: Waanders Publishers, 2007), 25.

[6] E. van der Pool-Stofkoper, "Verwachtingen en werkelijkheid: parken en tuinen van het domein Welgelegen in de periode 1808-1832," in *Paviljoen Welgelegen 1789-1989. Van buitenplaats van de bankier Hope tot zetel van de provincie Noord-Holland*, ed. F.W.A. Beelaerts van Blokland (Schuyt & Co: Haarlem, 1989), 126.

[7] E. Starkenburg, "'La Santé et salubrité du Pays'. Het streven van Lodewijk Napoleon naar een gezonde woonomgeving," *Lodewijk Napoleon en de kunsten in het koninkrijk Holland,* ed. E. Koolhaas-Grosfeld, et al., 307-10 (Zwolle: Waanders Publishers, 2007).

and Reinwardt shared a deep passion for experimental chemistry and the cultivation of foreign and exotic plants and the two men stayed in close contact until Van Marum's death in 1837.[8] Although Reinwardt already possessed a vibrant network in Amsterdam, it is highly likely that Van Marum also arranged for his friend to be made a member of the First Class of the Royal Institute of Sciences, Literature and Fine Arts (Koninklijk Instituut van Wetenschappen, Letterkunde en Schoone Kunsten) which Louis Napoleon founded in Amsterdam in 1808. Although the Royal Institute was never as active as the learned societies in Haarlem, Middelburg or Rotterdam, it provided a forum in which learned men such as Reinwardt and Van Marum could come together to present and promote their expertise.

This chapter thus illustrates the close relationship between science and sociability in the years after the Batavian Revolution, and how these enabled Reinwardt to further his career. By the time Napoleon forced his brother Louis Napoleon to abdicate the throne and leave the country in summer 1810, Reinwardt's status and position as a plant expert and chemist were secure. As extraordinary professor of chemistry and pharmaceutical art at Amsterdam's Athenaeum Illustre and a member of various learned societies, Reinwardt was a well connected figure ready to continue his career in a colonial context. But that is the topic of the fourth and fifth chapter.

Paviljoen Welgelegen: A Royal Garden in Haarlem

Reinwardt commenced his new position as royal gardener in Haarlem in late 1808. Originally, the palace Paviljoen Welgelegen had been built by the wealthy banker and merchant Henry Hope. Like other wealthy men of affairs in Amsterdam, Hope used the palace as country seat outside of the city for the summer months.[9] Hope was co-owner of the Amsterdam company, Hope & Co, which was specialized in large financial transactions between European powers. The company also traded grain, wood, potash, various colonial commodities, diamonds, gold, silver, seeds, textiles, ammunition,

[8] The extensive correspondence between Reinwardt and Van Marum can be found in the Noord-Hollands Archief in Haarlem. For detailed excerpts of the correspondence, see T.W. van Heiningen, *The Correspondence of Caspar Georg Carl Reinwardt*,

[9] R. van der Laarse, "De hang naar buiten. De notabele levensvormen van het Amsterdamse handelskapital," In *Beelden van de buitenplaats. Elitevorming en notabelencultuur in Nederland in de negentiende eeuw*, ed. Rob van der Laarse, et al., 25-48 (Hilversum: Veloren, 2005).

and cochineal, which they acquired in the Middle East, Northern and Central America and subsequently sold in Europe or Russia.[10] Owing to the relative decline of their business, the company also sponsored the Amsterdam Society of Dutch Chemists, whose experimental work aimed at improving the chemical processes necessary to purify or refine imported raw materials.[11]

Between 1769 and 1785, Hope had purchased nineteen parcels of land near Haarlem and not far from Amsterdam. The new venue was situated in the so-called Krommelaan area, which Albrecht of Bavaria had given to the city of Haarlem in 1390. In the middle of the seventeenth century, the southern part of the area had been transformed into a garden complex comprising around a hundred parcels of between 90 and 500 square meters. The parcels were first owned by Haarlem's administrative and learned elite.

In the course of the eighteenth century, the size of these parcels increased while the numbers of owners decreased. Many Amsterdam merchants bought several parcels at the same time and subsequently merged them into larger garden complexes.[12] Hope's new neighbour in Haarlem, for instance, was Egbert de Vrij Temminck (1700-1785), a mayor of Amsterdam and director of both the East India Company and West India Company. De Vrij Temminck even set up a private botanical garden on his piece of land.[13]

The establishment of Hope's new country seat, Paviljoen Welgelegen, next to the city's municipal forest, the Haarlemmerhout, involved a large reorganization of the whole area. In 1785, the Haarlem city council accepted the proposal of Hope's German architect, Johann Georg Michael (1738-1800), to build a thirty-two feet broad alley and a foot path from the entrance of his house to the Spanjaardenlaan at the southern boundary of the forest. Michael eventually transformed the Haarlemmerhout into a landscape garden with long winding paths and roads, flowering shrubs, vegetable gardens, and varied forest and tree arrangements.[14] The neo-

[10] Buist, *At spes non fracta*, 1-154.

[11] On the connection between the Hope brothers and the Amsterdam chemical community, see Roberts, "An arcadian apparatus," 251-76.

[12] M. Glaudemans, *Amsterdams Arcadia. De ontdekking van het achterland* (Eindhoven: 2000), 118-28.

[13] B.C. Sliggers, "Henry Hope's vermakelijke buitenleven en de Haarlemmerhout," in *Paviljoen Welgelegen 1789-1989. Van buitenplaats van de bankier Hope tot zetel van de provincie Noord-Holland*, ed. F.W.A. Beelaerts van Blokland (Haarlem: Schuyt & Co, 1989), 28.

[14] Ibidem, 29-39.

classical palace, which comprised large representative rooms for Hope's substantial art collection, was erected on the west side of his property.[15] When French troops invaded the country in 1794/95, Hope left the Netherlands and settled in Britain, but it was not until 1808 that he finally sold Paviljoen Welgelegen and the surrounding land to Louis Napoleon for 300.000 guilders.[16]

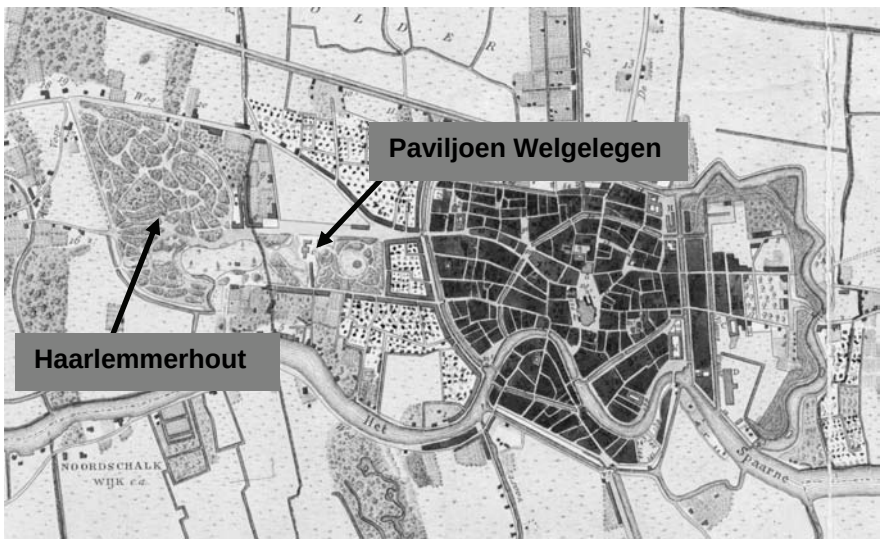

Figure 18: Map of Haarlem by F.J. Nautz, with Paviljoen Welgelegen and Haarlemmerhout marked.

Michael's reorganization of the landscape in the Haarlemmerhout formed an important basis for Louis' Napoleons own royal botanical garden and menagerie. From August 1808 until May 1809, Reinwardt and Johan Meerman (1753-1815), Director General for Education and Sciences (Directeur-generaal van onderwijs en wetenschappen) discussed and developed the exact layout of the garden. Johan David Zocher, sr., used the information as the basis for a construction plan which he finished in the

[15] J. Nederlof, "Bouwgeschiedenis en architectuur," in *Paviljoen Welgelegen 1789-1989. Van buitenplaats van de bankier Hope tot zetel van de provincie Noord-Holland*, ed. F.W.A. Beelaerts van Blokland (Haarlem: Schuyt & Co, 1989), 41-52.

[16] M.G. Buist, "Henry Hope, merchant-bankier, bouwheer van Welgelegen," in *Paviljoen Welgelegen 1789-1989. Van buitenplaats van de bankier Hope tot zetel van de provincie Noord-Holland*, ed. F.W.A. Beelaerts van Blokland (Haarlem: Schuyt & Co, 1989), 18-25.

course of 1809.[17] According to this plan the garden comprised an orangery, various beds for domestic plants, fruit, and herbals, a hot house for exotic plants, an arboretum, a separate garden for fruit trees and vegetables, and a house for a collection of dried plants, a library and perhaps even a small laboratory. All these elements were smoothly integrated into the landscape. Moreover, Meerman and Reinwardt prepared a list of dead and living animals to be bought for the new menagerie. Guiding framework for their planning was the Jardin des Plantes of the National Museum of Natural History (Muséum national d'Histoire naturelle) in Paris.[18]

Like the royal garden in Paris, the garden in Haarlem had thus various functions. It illustrated for domestic and foreign visitors the wealth and prestige of the kingdom. It functioned as a place where new medicinal and economically rewarding plants could acclimatize. And, finally, the garden had a political function, creating a space where citizens could sensually engage in and gradually identify themselves with the kingdom's environment. Nature thus appeared as a sublime spectacle successfully disciplined by the king's gardeners. To attract the visitor's attention, elements such as caves, hills, tree arrangements, exotic flowers, shrubs and unexpected views formed an essential part of the garden's design.[19]

Reinwardt commenced his position as director of the garden at Paviljoen Welgelegen in July 1808, employing as his new secretary his former Harderwijk disciple, Jacob Vosmaer (1783-1824). Antoine Alpy, owner of a large number of living animals, became director of the menagerie, and the Leiden planter Hermanus Schuurmans Stekhoven (1757-1855) was appointed head gardener. Both received accommodations in the northern part of the park. Reinwardt and Daniel J. Guicherit, whom the king had

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[17] For a reprint of Zocher's construction plan, see C. Oldenburger and J. Oldenburger, *Zocher on-line. Groenprojecten van de Zochers in perspectief. Landschapsarchitectuur in 19de eeuws Nederland* (Amsterdam: Oldenburgers Historische Tuinen, 2009). Available online: http://www.historischetuinen.nl/oldenburgers/pdf/zocher-online.pdf (accessed: 12 July 2011).

[18] L. Brummel, "De zorg voor kunsten en wetenschappen onder Lodewijk Napoleon," *Publicaties van het Genootschap voor Napoleontische studiën* 1 (1951): 14-26.

[19] E. Koolhaas-Grosfeld, "Nature and culture II," in *Dutch culture in a European perspective,* vol. 2, *1800: Blueprints for a national community*, ed. J. Kloek, et al., 333-42 (Assen: Royal van Gorcum, 2004). On the interplay between gardens and revolutionary politics in France, see Spary, *Utopia's garden,* chapter 5. A more general survey of the form and function of gardens around 1800 is provided by N. Robin, "The influence of scientific theories on the design of botanical gardens around 1800," *Studies in the history of gardens & designed landscapes* 28:3&4 (2008): 382-99.

appointed as administrator of the entire royal domain, were lodged in a house closer to the palace.[20]

Figure 19: View of the Paviljoen Welgelegen with visitors strolling through the park.

As director of the new garden, Reinwardt regularly received seeds and plants from various plant experts from within the Netherlands and abroad. In 1809, for instance, Meerman forwarded him a box with around twenty seeds which an unknown planter from Nuremberg had sent to Haarlem on his own initiative. Although Reinwardt usually declined such shipments, he advised Meerman to make an exception because the box possibly contained unknown 'oeconomic' plants which might help to improve domestic agriculture. Reinwardt further asked Meerman whether he could plant the seeds in the royal garden in order to propagate more seeds to learn more about the efficient cultivation of the crops.[21]

Although Reinwardt and the king's architect, Thibault, had quickly agreed on the exact layout and positioning of the new garden, actual construction work proceeded slowly. At the end of 1809, neither the public menagerie nor the garden had been completed. The wild animals—about twenty-five of them, including a lion, a bear, a wolf, a panther, birds, a tiger

[20] Van der Pool-Stofkoper, "Verwachtingen en werkelijkheid," 126, 129-30.
[21] MM The Hague, letter Meerman to Reinwardt, Haarlem, 10 April 1809.

and several monkeys—had to be accommodated in the nearby coach house and the palace's stables. The useful exotic, 'oeconomic' and medical plants were stored in the old orangery. Already in March 1808, Reinwardt warned the administrators of the king:

> Only just in time and with difficulty, however, I managed to rescue and store the plants already present in the king's garden during the last winter season, not only in the small orangery but also in the pineapple greenhouses, the stables and partly also at good friend's places. This won't be possible during the next winter of 1809, on the one hand because the number of plants has already risen and will further increase . . . through cultivation, shipments of seeds and crops, etc., and, on the other hand, because it is highly likely that the mentioned storage places will be used for other pursuits, and regardless they are not adequate for a severe winter. This means that if the greenhouses, orange houses, etc. as scheduled in the new large plan aren't either entirely, or at least partly, finished before the next winter season, then other means will have to be found and or expenses have to be made which are not yet incorporated in the budget.[22]

In the end, the garden and the menagerie were never fully built; only remnants of it are visible on later maps. After a visit to Paviljoen Welgelegen in May 1809, Louis Napoleon suddenly decided to move the animals, plants

[22] NA The Hague, Ministerie van Financiën: Kroondomein, 1806-1810, inv. 57, letter Reinwardt to I.A. Twent, Haarlem, 3 March 1809: "Hoewel ik de planten, nu reeds in 's Konings tuin aanwezig, gedurende bijna verlopen winter saizoen, echter niet dan naauwelijks en met moeite, behalve in de kleine orangerie alhier, in de ananaskassen, paardenstallen en gedeeltelijk ook bij goede vrienden heb overgehouden, zal dit echter het volgende winterseizoen van 1809 niet geschieden kunnen, eensdeels omdat het getal der planten al gestegen . . . echter door aankeweeking, toezending van zaden en gewassen enz. aanmerkelijk zal vermeerderd worden, en anderen deels, omdat waarschijnlijk de laatsgemelde bewaarplaatsen tot andere einden zullen moeten gebezigd worden, en ook bij eenen gestrengen winter niet voldoende zijn. Indien dierhalven onverhoopt de broeikasten, oranje huizen enz. voor het nieuwe groote plan geprojecteerd, voor het aanstaande wintersaizoen hetzij geheel, hetzij gedeeltelijk niet mogten tot stand komen, dan zouden er andere middelen beraamd en onkosten gemaakt moeten worden die almede in de eerste opgave niet begrepen zijn."

and collections of natural historical objects to Amsterdam. The poor health of some of the animals may have tipped the scales. While the animals were transferred to the Amsterdam *hortus botanicus*, the plants were moved to the garden of the Royal Institute of Science at the Kloveniersburgwal. In order to guarantee the survival of the living plants, Louis Napoleon appointed Reinwardt's former teacher Gerardus Vrolik as second director of the now fragmented royal garden and menagerie. While Reinwardt was now responsible for the menagerie and the natural history collection, Vrolik took care of the living plants.[23]

The removal of the animals and plants to Amsterdam turned out not to be a final solution. Already a year later, in June 1810, Louis Napoleon decided to dissolve the menagerie and the natural history collection. The remaining animals—apparently two lions, a tiger, a zebra and an ostrich had not survived the move from Haarlem to Amsterdam—were offered for sale in the royal newspaper in July.[24]

The preceding paragraphs have shown that the garden and menagerie in Haarlem turned out to be a shaky launching pad for Reinwardt's career. Although the new position as royal gardener seemed promising, not at least because of the higher salary, the garden project never got off the ground, and the institution's move to Amsterdam deprived Reinwardt of an important pillar of his existence and a career as a naturalist seemed out of reach. The following sections will show how Reinwardt compensated for this setback by increasing his engagement in Haarlem's learned societies. His friendship with Van Marum, the influential secretary of the Dutch Society of Sciences, proved decisive in making up for Louis Napoleon's capricious garden policy.

Socializing with Haarlem's Elite

Reinwardt had regularly attended the meetings of the Dutch Society of Sciences from 1805. The society had been established by well-situated members of Haarlem's elite in the aftermath of the Austrian War of Succession (1740-48) in 1752. Since the war had hit Haarlem's formerly flourishing textile industry heavily, its investors considered the society as a platform to enjoy 'sociability' while searching for ways to improve the

[23] Groen, "De tuinen van Lodewijk Napoleon," 43.
[24] G.A. Evers, *Utrecht als koninklijke residentie. Het verblijft van Lodewijk Napoleon te Utrecht 1807-1808* (Utrecht: A.W. Bruna & Zoon, 1941), 200-201.

dwindling local industry.[25] As board members of the new society, they subsidized the activities of the regular members who were supposed to deliver lectures and review contributions for the society's proceedings. New members were chosen for their high reputation or, for instance, because of an essay they had submitted to one of the society's essay competitions.[26]

Backed by a physico-theological notion that society and human beings were malleable and reformable entities, the members of the Dutch Society used these competitions to spread and popularize 'useful' knowledge. These competitions addressed a large variety of 'useful' topics ranging from the silting of rivers to the prevention of the breaking of dams, the physical education of children, the purification of water with charcoal, the speed of water flow in rivers, the decline of Dutch trade and other natural historical, chemical or philosophical issues. In 1777, the members of the Dutch Society even decided to establish a separate 'oeconomic' branch—the Oeconomische Tak van de Hollandsche Maatschappij der Wetenschappen—to further stimulate the production and circulation of 'useful' knowledge in order to mitigate the nation's flagging economy.[27]

Essays were usually judged by small committees with expertise in the field. Reinwardt participated in several of these committees. Together with Van Marum, Sebald Justinus Brugmans (1763-1819), professor of natural history in Leiden, the Amsterdam professor and director of the botanical garden Gerardus Vrolik, the veterinary expert Jan Arnold Bennet (1758-1828), and the patriot agronomist Jan Kops, Reinwardt judged essays on silviculture, the reproductive power of plants, the fertilization of uncultivated areas, lead poisoning from water and the interaction between charcoal and water, and the differences between shell and lump lime.[28] In 1808,

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[25] W.W. Mijnhardt, *Tot heil van 't menschdom. Culturele genootschappen in Nederland, 1750-1815* (Amsterdam: Radopi, 1987), 88. The link between sociability and utility is established by L. Roberts, "Going Dutch: Situating science in the Dutch enlightenment," in *The sciences in enlightened Europe*, ed. William Clark, et al. (Chicago: University of Chicago Press, 1999), 380.

[26] For an overview of the members, see Bierens de Haan, *De Hollandsche Maatschappij der Wetenschappen*, 338, Bijlage VII: Naamlijst van directeuren, binnenlandse en buitenlandse leden van de maatschappij van de stichting in 1752 tot 1 januari 1952.

[27] Mijnhardt, *Tot heil van 't menschdom,* 52-4 and 90, and J. Bierens de Haan, *Van Oeconomische tak tot de Nederlandsche Maatschappij voor Nijverheid en Handel, 1777-1952* (Haarlem: Tjeenk Willink, 1952).

[28] NHA Haarlem, 492: Hollandsche Maatschappij der Wetenschappen, Notulen 1805-15, see pages 1866, 1899, 1934, 2010-2012.

Reinwardt even proposed an essay competition on the question on the production of what is now called oxygen in the atmosphere.[29]

Besides reviewing essay competitions, the members of the society used their meetings to practice and enjoy sociability, one of the core elements that bound together the learned middle-class and mercantile elite in late Dutch Republic.[30] One of the more important topics of their 'cultured' conversations was the society's natural historical and mineralogical cabinet which since 1777 was displayed in the rooms where the members held their regular meetings. For Reinwardt, such conversations about plants and minerals were a rather simple social exercise. His knowledge of plants and minerals, which he had gained as an apothecary, far exceeded that of many other members.

The cabinet witnessed an immense growth in these years. The collections comprised shells, horns, stuffed animals and insects, fossils, minerals and dried plants which wealthy amateurs and others had gathered in the Netherlands and abroad. In 1762, the society had, for instance, received a shipment of natural historical items from the East Indies. The items had been brought together by the governor-general of the Netherlands Indies, Jacob Mossel (1704-1761). A few years later, the cabinet was further enriched with the collection of Jacob Cornelis Sylvius van Lennep, one of the society's directors, and various specimens from the physician Job Baster (1711-1775). Specimens and drawings from other Dutch colonial outposts in Surinam, Bengal, Japan and the Cape quickly followed. The majority of the collectors were aristocrats or employees of the VOC or West India Company.[31]

Owing to the growing number of specimens, which came to equal the cabinets of other wealthy private collectors in Haarlem, the directors of the Dutch Society decided in 1777 to appoint Van Marum, then twenty-

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[29] Ibidem, Notulen 1808, page 1949.

[30] J. Kloek and W. Mijnhardt, "Sociability," in *Dutch culture in a European perspective*, vol. 2, *1800: Blueprints of a national community*, ed. J. Kloek, et al. (Assen: Royal van Gorcum, 2004), 93-114.

[31] For a detailed history of the natural historical collection of the *Hollandsche Maatschappij*, see B.C. Sliggers, "Het naturaliënkabinet van de Hollandsche Maatschappij der Wetenschappen," in *Het verdwenen museum. Natuurhistorische verzamelingen 1750-1850,* ed. B.C. Sliggers, et al., 46-142 (Blaricum/Haarlem: V+K Publishing/Teyler's Museum, 2002); and J.A. Bierens de Haan, *De geschiedenis van een verdwenen Haarlemsch museum van natuurlijke historie* (Haarlem: De Erven F. Bohn N.V., 1941).

seven, as director of the society's collection.[32] Van Marum had studied medicine, botany and philosophy under Petrus Camper (1722-1789) at the University in Groningen. Camper taught not only experimental physiology, but also obstetrics, pharmacology, botany, surgery, and anatomy. In his botanical lectures and classes, Camper stressed the importance of experimental physiological research in order to understand the inner anatomy of plants. Van Marum, who was attracted by Camper's physiological work, finished his university education in 1773 with both a philosophical and a medical dissertation. Both dealt with the movement of fluids in plants and in animals and were based on exhaustive experimental research with an electrical machine he had designed together with his friend the instrument maker Gerhard Kuyper.[33]

When the academic senate in Groningen ignored Van Marum's ambition to succeed his teacher Camper as professor of botany, he moved to Haarlem and established himself as a physician. Beside his practical work, he also offered private classes in physics for interested citizens, merchants, magistrates and notables to whom he demonstrated the 'usefulness' of physical and chemical experiments. In 1777, he was eventually appointed municipal lecturer in philosophy and mathematics. During the summer months, he also lectured on geology, physics, hydrostatics, medical sciences, geology and mechanics. Those lectures were held at the former concert hall of the Prinsenhof where the Dutch Society also held its monthly gatherings. In 1780, he married Joanna Bosch, daughter of Jan Bosch, the wealthy printer of the proceedings of the Dutch Society. Bosch's financial assets allowed Van Marum to make extensive journeys through Europe during the summer months.[34]

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[32] For a biographical sketch of Van Marum, see B. Theunissen, "Martinus van Marum, 1750-1837. 'Ten nutte en ten genoegen der ingezetenen," in *Een elektriserend geleerde. Martinus van Marum 1750-1837,* ed. A. Wiechmann, et al., 11-32 (Haarlem: Joh. Enschedé en Zonen, 1987); and A.M. Muntendam, "Dr. Martinus van Marum," in *Martinus van Marum. Life and Work*, vol. 1, ed. R.J. Forbes, 1-72 (Haarlem: H.D. Tjeenk Willink & Zoon, 1969).

[33] T.H. Levere, "Martinus van Marum and the introduction of Lavoisier's chemistry into the Netherlands," in *Martinus van Marum. Life and Work,* vol. 1, ed. R.J. Forbes (Haarlem: H.D. Tjeenk Willink & Zoon, 1969), 159.

[34] For more details on Jan Bosch and other learned amateurs in Haarlem, see B.C. Sliggers, "Honderd jaar natuurkundige amateurs te Haarlem," in *Een elektriserend geleerde. Martinus van Marum, 1750-1837*, ed. A. Wiechmann, 67-102 (Haarlem: Joh. Enschedé en Zonen, 1987).

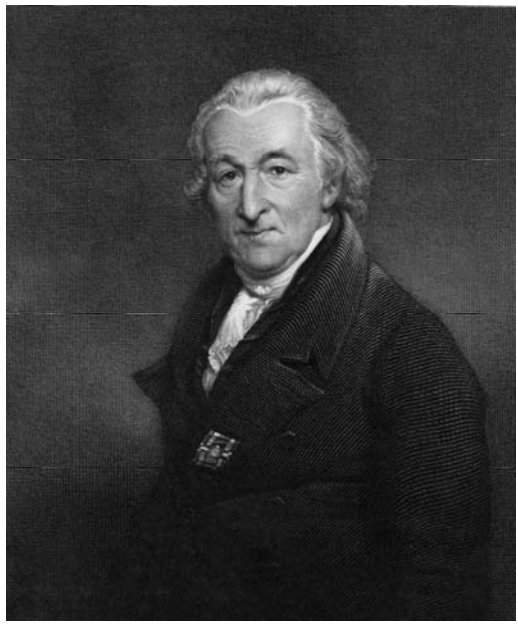

Figure 20: Portrait of Martinus van Marum (1750-1837), secretary of the Hollandsche Maatschappij der Wetenschappen (Dutch Society of Sciences).

Beside his work at the Dutch Society, Van Marum was also a member of Haarlem's second learned society: Teyler's Second Society (Teylers Tweede Genootschap). In 1784 he was even made director of the society's natural historical and physical cabinet and library. The society had been founded with the bequest of the silk manufacturer and merchant Pieter Teyler van der Hulst (1702-1778). Owing to his Mennonite background, Van der Hulst had never been engaged as sponsor and member of the Dutch Society of Sciences. In fact, Teyler van der Hulst's enormous financial assets helped fund two societies—a theological and a learned society—as well as a museum for antique coins, physical instruments, paintings, sketches, books, and natural historical items.[35] Teyler's Museum opened its doors in 1784. In order to prevent rivalries between this cabinet and that of the Dutch Society, the directors of the societies separated their fields of interest: while the Dutch

[35] For more details on Teyler van der Hulst and his ideals, see B. Sliggers, et al., eds., *De idealen van Pieter Teyler. Een erfenis uit de verlichting* (Haarlem: Gottmer Uitgevers Groep, 2006).

Society focused on zoological specimens, Teyler's Museum accumulated geological specimens.[36]

Beside geological and mineral specimens, Van Marum continuously enriched the museum with new instruments and measuring devices which he used during his public classes. Although the directors of Teylers Foundation (Teylers Stichting) questioned Van Marum's utilitarian approach, Van Marum continued acquiring a large number of these devices. His acquisitions comprised instruments such as small cranes, a magnetic compass, capillarity plates, hydrometers, electrometers, barometers, thermometers, mirrors, and telescopes.[37] One of the most spectacular instruments at Teyler's Museum was a huge electrostatic generator which Van Marum developed in cooperation with the English instrument maker John Cuthbertson (1743-1821), who had lived in Amsterdam since 1766. The machine, which was financed by Teyler's Second Society, was completed and moved to the museum in 1784. It consisted of two large glass discs with a diameter of sixty-five English inches. Owing to its sheer size, the machine attracted a large number of visitors and scholars from the Netherlands and abroad. Van Marum's public demonstrations and his written accounts of the machine and the experiments conducted with it were enthusiastically received not only in Haarlem, but also at academies in Paris, London and St. Petersburg.[38]

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[36] For more information on the organization of the museum and the role of Van Marum, see B. Sliggers, "Het idée van een Ovale Zaal," *Teylers Magazijn. Special issue: Teylers Ovale Zaal* (2009): 12-17; and A. Wiechmann and L. Touret, "Frappez, frappez toujours! Van Marum als verzamelaar en bezieler van het geleerd bedrijf in Haarlem," in *Een elektriserend geleerde. Martinus van Marum, 1750-1837,* ed. A. Wiechmann, et al., 103-53 (Haarlem: Joh. Enschede en Zonen. 1987). The changing relationship between the museum and the public is discussed in M. Weiss, "De gang naar toegankelijkheid. Publiek gebruik van Teylers Museum in de negentiende eeuw," *De negentiende eeuw* 34:3 (2010): 267-85.

[37] For more information on Van Marum's acquisitions for Teylers physical cabinet, see Wiechmann and Touret, "Frappez, frappez toujours!," 121-25; and G.L.E. Turner, "A very scientific century," *Martinus van Marum. Life and Work*, vol. 4, *Van Marum's scientific instruments in Teyler's Museum*, ed. E. Lefebvre, et al. (Haarlem: Hollandsche Maatschappij der Wetenschappen, 1973), 9-12, 17-18.

[38] For an English translation of Van Marum's description of the machine, see M. van Marum, "Description of a very large electrical machine installed in Teyler's Museum at Haarlem and of the experiments performed with it (Haarlem, 1785)," in *Martinus van Marum: Life and work*, vol. 5, ed. E. Lefebvre, et al., 1-237 (Haarlem: Tjeenk Willink, 1974).

A Crucial Friendship

Although his classes, lectures and demonstrations of various useful physical and chemical measuring devices received a new stimulus in the aftermath of the Batavian Revolution in 1795, Van Marum gradually lost interest in experimental work and turned his attention back towards the cultivation and observation of plants in their natural environment, an interest he had fostered since his years in Groningen. One reason for this shift was the ongoing tension with the directors of Teyler's Foundation. While Van Marum continuously requested costly chemical and physical measuring instruments and hardware to continue his experiments, the directors preferred to direct their funds to charitable purposes or the acquisition of art.[39]

In order to pursue his botanical interests, Van Marum purchased a house and land close to the river Spaarne on the southern edge of Haarlem. The new venue, which Van Marum baptized Plantlust, comprised several garden beds, a gardener's lodge and stables. In 1804, a new parcel was added for the cultivation of foreign plants.[40]

Reinwardt and Van Marum, who already knew each other from meetings of the Dutch Society of Sciences, must have further intensified their friendship in the years 1808 and 1809. While Van Marum eagerly tried to find plant experts who could help him improve his garden, Reinwardt sought to expand his social network in Haarlem. Since Van Marum's garden was less than a kilometre away from Paviljoen Welgelegen where Reinwardt was employed as royal gardener, they visited each other frequently.[41] In one of the many letters to Van Marum written from Java a couple of years later, Reinwardt rather emotionally described the early years of their friendship:

> If our relationship had been restricted to mere scientific communication, as they began, then the absence would be enormous, but bearable—although one misses it here a lot;

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[39] On the tensions between Van Marum and the directors of Teylers Tweede Genootschap, see Mijnhardt, *Tot heil van 't menschdom,* 300-39.

[40] M.J. van Steenis-Kruseman, "Botany and gardening," in *Martinus van Marum. Life and Work*, vol. 3, ed. R.J. Forbes, 129-36 (Haarlem: H.D. Tjeenk Willink & Zoon, 1971).

[41] In a later letter Reinwardt refers to these earlier visits of Plantlust. NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Buitenzorg, 1 January 1817.

> it is only now that I realize how much it has become interwoven with my entire person, it was a need for my heart and a source of my satisfaction and happiness.[42]

Following the prevailing fashion of the period, Van Marum designed his garden in the organic English landscape style rather than in the more formal and artificial arrangement preferred by the French. He thus carefully integrated the cultivated plants into the natural terrain of the area. The majority of the flowers, trees and shrubs were planted in long rows along the paths that curled through the territory. Van Marum sorted his garden according to the scheme developed by the South African botanist Christiaan Hendrik Persoon (1761-1836). It is highly likely that Van Marum regularly invited friends to his garden to instruct them about the order of plants and their relationship with the environment.

Figure 21: Van Marum's garden, Plantlust, in 1822.

Van Marum quickly established an international network of professional and amateur gardeners. Within the Netherlands, he purchased

[42] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Batavia, 14 September 1816: "Hadden onze betrekkingen zich slechts tot wetenschappelijke mededeeling bepaald, gelijk zij begonnen zijn, dan zoude dat gemis reeds groot doch misschien, hoe zeer men het ook hier mist, nog verdraagelijk zijn; nu eerst ontwierd ik hoezeer zij in mijn gehele wezen waren ingeweven, voor mijn hart eene behoefte en de bron waren van mijne tevredenheid en vergenoegdheid."

seedlings from companies in the Haarlem area, but he also dealt with planters in Brussels, as well as in Norwich and Chelsea, near London. Beside private planters, Van Marum regularly visited and exchanged specimens with the directors of various academic and medical gardens in the Netherlands, Great Britain, Flanders, Denmark, Germany, Switzerland, France and Austria. In Austria, for instance, he corresponded with the botanist Joseph von Jacquin (1727-1817) who was director of the botanical gardens of the university in Vienna.[43]

Van Marum's intensive engagement gradually bore fruit in 1810, when he published an extensive catalogue of the plants he cultivated in his garden. Among the roughly 2900 plant specimens, one could find a large amount of succulents originating from South Africa.[44] Many of these, such as *Aloe vera,* had medicinal properties, and since they stored water in their leaves, they could be cultivated in dunes and other areas were water was scarce. Other plants in his garden came from around Europe, the Mediterranean, the Americas, Asia and Australia (New Holland). In order to expand his plant cultivation, Van Marum eventually decided to build an orangery according to a design by his friend Reinwardt. A year later in 1817, he further enlarged his garden with a hot-house for the exotic plants which he expected to receive from Reinwardt, who had left for the Indies in 1815. From 1823 onwards, Van Marum even employed two gardeners who helped him maintaining the garden.[45]

Experimental chemistry was another interest that linked Reinwardt and Van Marum. Like the older Van Marum, twenty-three years his senior, Reinwardt was experienced in dealing with chemical and other measuring devices. In 1807/08, they carried out joint experiments with potash, which was used in the industrial production of glass, soap and fertilizers. They later reported that in their experiments, which were based on the work of the chemists Louis Joseph Gay-Lussac and Louis Jacques Thénard (1777-1858), they apparently succeeded in splitting potash into its different constituent elements by treating it with fire.[46]

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[43] For an overview of Van Marum's extensive botanical correspondence network, see Van Steenis-Kruseman, "Botany and Gardening," 139-49.

[44] M. van Marum, *Catalogue des plantes cultivées au printemps 1810, dans le jardin de M. van Marum à Harlem* (Haarlem: 1810).

[45] Van Steenis-Kruseman, "Botany and gardening," 137-39.

[46] Verslag van de werkzaamheden der eerste klasse van het Koninklijk Instituut van Wetenschapen, Letterkunde, en Schoone kunsten uitgebracht in de algemene vergadering des jaars 1809, 29.

Socializing at the Royal Institute in Amsterdam

In the years that followed, Reinwardt and Van Marum remained in close contact. After Reinwardt's appointment as professor of natural history, chemistry and botany at the Athenaeum Illustre in Amsterdam in the summer of 1810, they frequently saw each other during meetings of the Royal Institute of Sciences, Literature and Fine Arts (Koninklijk Instituut van Wetenschappen, Letterkunde en Schoone Kunsten) which had been established in Amsterdam on the initiative of Louis Napoleon in the spring of 1808.[47] From 1812 onwards, meetings of the Royal Institute were held at the Kloveniersburgwal in the centre of Amsterdam in a monumental house of the art-dealer and painter Cornelis Sebille Roos (1754-1820), which eventually became the institute's permanent home.[48]

In Louis Napoleon's view, the institute had to fulfil two roles: It was supposed to illustrate the splendour and prestige of his kingdom, and, as was true of the Institut de France in Paris, its members were expected to advise the government on a broad range of issues. This latter goal was never fully realized. Unlike the Institut de France, the Royal Institute never developed into a central advisory organ to the government, and after the Dutch kingdom became part of the French Empire in 1810, the Royal Institute even fell into obscurity.[49] Renamed the Dutch Institute of the Sciences, Literature and Fine Arts (Hollandsch Instituut van Wetenschappen, Letterkunde en Schoone Kunsten), it received hardly any attention from the administrators in Paris who derisively referred to the institution as 'l'Institut d'Amsterdam'.[50]

Although the institute in Amsterdam was not very active, its meetings provided opportunities to practice and enjoy 'sociability'. By listening to lectures and conversing on a broad range of topics, the institute offered a forum where new contacts could be made and gossip about the country's learned world exchanged. The contacts with foreign national academies linked it with Europe's learned world. Beside their work as

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[47] A copy of the royal decision can be found in: UB Leiden, BPL 2425, III: Royal decision, 28 June 1808.

[48] K. van Berkel, *De stem van de wetenschap*. *Geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen, deel I: 1808-1914* (Amsterdam: Uitgeverij Bert Bakker, 2008), 57-8, 63-66, 88-90.

[49] The close ties between science and government in France is further investigated by Ch. C. Gillispie. *Science and polity in France: The revolutionary and Napoleonic years* (Princeton: Princeton University Press, 2004), chapters 6 and 7.

[50] Van der Burg, *Nederland onder Franse invloed,* 215-16.

advisors to the colonial government, the members regularly used their meetings to discuss important observations published in the proceedings of other academies in Europe, which could be accessed in the institute's library. [51] At the end of 1809, the institute counted about eighty corresponding members including such luminaries as Alexander von Humboldt and the French chemist Antoine François Fourcroy.[52]

Both Reinwardt and Van Marum were members of the so-called First Class of the Institute. While the Second, Third and Fourth Class dealt with Dutch history and literature, fine arts and the languages and culture of the antique world, the First Class was supposed to focus on mathematical and natural philosophical inquiries.[53]

The First Class counted in total around thirty members, many of them apothecaries, chemists, botanists, engineers and farmers. The founding members were, in addition to Van Marum, the Amsterdam professor of physics and astronomy, Jan Hendrik van Swinden, the anatomist Andreas Bonn, the lecturer for physics Hendrik Aeneae, the water engineer Jan Blanken (1755-1838), the Leiden professor of chemistry and natural history Sebald Justinus Brugmans, the astronomer and navigation expert Jan Frederik van den Beek Calkoen (1772-1811), the physician Matthias van Geuns (1735-1817), who held a chair at Harderwijk University, the mathematician and map expert Jacob Florijn (1751-1818), the Amsterdam apothecary and chemist Willem van Barneveld (1747-1826), and eventually the patriot military commander and fortification expert Cornelis Kraijenhoff (1758-1840).

Yet in the same year, the First Class was enlarged further. Beside the appointment of Reinwardt, the new group comprised the apothecary Adriaan Paets van Troostwijk, the physician and botanist Gerardus Vrolik, the marine engineer Pieter Glavimans (1755-1820), the Groningen lecturer for agricultural chemistry, chemistry, *materia medica* and natural history Petrus Driessen, the agronomists Jan Kops and Allard Philip Reinier Carel van der

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[51] Proces verbaal van de tweede algemene vergadering van het Koninklijk Instituut van Wetenschappen, Letterkunde, en Schoone Kunsten, gehouden in Amsterdam den 28 Augustus—1 September des jaars 1809, 3.

[52] D.J. van de Kaa and Y. de Roo, *De leden van de Koninklijke Nederlandse Akademie van Wetenschappen. Een demografisch perspectief: 1808 tot 2008* (Amsterdam: KNAW Press, 2009), 154-55.

[53] Proces Verbaal van de eerste algemene vergadering van het Koninklijk Instituut van Wetenschappen, Letterkunde, en Schoone Kunsten, gehouden in Amsterdam den 24sten en 27sten Augustus, des jaars 1808, 7.

Borch van Verwolde (1766-1836), the veterinary surgeon Jan Arnold Bennet, and finally the physician Cornelis Hendrik à Roy (1750-1833). [54] Interestingly, these men had trained in a variety of different practical, medical and governmental contexts, and only some of them had pursued a formal academic training.

The majority of the members came from Amsterdam or the neighbouring provinces, and many had already been involved in various surveying, improving and mapping projects launched in the aftermath of the Batavian Revolution in 1795. Kraijenhoff, for instance, played a crucial role in the triangulation of the country after 1798, and his measurements served as the basis for the new map of the Batavian Republic.[55]

Like the other classes, the First Class had a difficult start. Owing to a lack of financial support from the government, the members had neither a suitable venue for meetings nor a laboratory in which to carry out experiments. Repeated complaints about the inadequate facilities in the annual reports of the First Class went unanswered.[56] Nonetheless, the tasks of the First Class were wide-ranging. First, they had to draft advisory reports on different issues raised by ministers, other high officials, or the king himself. In 1808/09, for instance, the members were asked to investigate whether a certain sort of cement would meet the necessary requirements for public construction work. Since such investigations demanded large-scale, months-long studies requiring sophisticated devices and tools, the experimentation had to be done elsewhere. In their annual report of 1809, the members of the First Class commented on the situation as follows:

> It is only by chance, that one of the members was able to reserve a part of his house and that the circumstances allowed him to use that part [of his house] for such a long time without using it for his family. Such a situation cannot persist, not in the long run and not [that] often.[57]

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[54] Ibidem, 3-5, 7-8.

[55] Uitterhoeve, *Cornelis Kraijenhoff 1758-1840*, chapter 6.

[56] See, for instance, Verslag van de werkzaamheden der eerste klasse van het Koninklijk Instituut van Wetenschappen, Letterkunde en Schoone Kunsten uitgebracht in de algemene vergadering des jaars 1809, 3.

[57] Proces verbaal van de eerste algemene vergadering van het Koninklijk Instituut van Wetenschappen, Letterkunde, en Schoone kunsten, gehouden in Amsterdam den 28 Augustus—1 September des jaars 1809, 38: "*Het is slechts bij toeval, dat een der Leden een gedeelte van zijn huis daartoe heeft kunnen afstaan, en dat de omstandigheden hem*

Until his departure for the Netherlands-Indies in late 1815, Reinwardt contributed to more than ten different reports. In 1809, Reinwardt and three of his colleagues were asked to investigate whether the work and theories of the French architect and agriculturist François Cointereaux (1740-1830) could be used in the Dutch kingdom. Cointereaux, founder of a school for rural architecture, advocated using clay for the construction of new buildings in the countryside. [58] In order to examine Cointereaux's methods, the members ran practical tests of his method and reviewed fourteen of his books. Moreover, they examined several of Cointereaux's agricultural models which Louis Napoleon had forwarded to the First Class. In the end, Reinwardt and his colleagues concluded that Cointereaux's way of constructing buildings was hardly applicable in the Dutch kingdom, due largely to the high humidity that prevailed across much of the country.[59]

In 1810, Reinwardt, Van Marum and the soil expert Adriaan Gilles Camper (1759-1820) were asked to investigate quartz stones in the vicinity of Amersfoort which had attracted the attention of Louis Napoleon on one of his inspection tours through the country. Since the stones looked like diamonds, the king was eager to know whether the stones had any economic value. Although Reinwardt, Van Marum and Camper came to the conclusion that the stones were rather useless, the minister for the interior who first received the final rapport advised the members to continue with their research and to draw on the expertise of mining workers as well.[60]

In a third commission, Reinwardt and Van Marum worked together with the mathematician Adriaan van den Ende. The trio was asked to review a business plan submitted to the minister of the interior by Abraham Ypelaar (1736-1811). After the disastrous outcome of Fourth Anglo-Dutch War, Ypelaar had shifted the focus of his commercial activities from processing diamonds to the preparation of microscopical cabinets which he sold to interested and wealthy amateurs. Each cabinet comprised a large number of natural historical samples (the biggest cabinet counted 1800 pieces) such as small insects, external and internal parts of those insects, fish scales, woodcuts,

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veroorloofd hebben, dat gedeelte zoo langen tijd te kunnen afstaan, zonder het ten behoeve van zijn huisgezin te gebruiken. Zoodanig iets kan, nog op den duur, noch zelfs dikwerf gebeuren."

[58] L. Cellauro and G. Richaud, "Thomas Jefferson and François Cointereaux, professor of rural architecture in revolutionary France," *Architectural history* 48 (2005): 173-74.

[59] Verslag van de werkzaamheden der eerste Klasse van het Koninklijk Instituut van Wetenschappen, Letterkunde, en Schoone Kunsten uitgebracht in de algemene vergadering des jaars 1809, 10.

[60] Ibidem, 1810, 6-7.

various parts of shrubs, plants, flowers, seeds, membranes, mushrooms, minerals, gold, silver, copper, iron, metals, stones, petrified wood, and so on. Although Reinwardt, Van Marum and Van den Ende were rather positive about Ypelaar's commercial and natural historical activities, they rejected the plan to subsidize the further expansion of his company on the grounds that it would neither contribute to the general well-being of the people nor contribute much to the development of new natural historical insights.[61]

In 1813/14, Reinwardt again participated in several committees where he worked together with Van Marum, Vrolik, Kops, Van Swinden, Bennet and Paets van Troostwijk. Beside reviews of two cement companies, Reinwardt and his colleagues were asked to report on an aerometer forwarded by the director of the indirect taxes of the department Zuiderzee.[62] The aerometer was used to determine import and export taxes on fluids. Reinwardt, Vrolik and Van Swinden, who actually carried out the investigation, first compared the aerometer of the tax officers with another aerometer which they possessed already. After the comparison they concluded that both aerometers met the standard defined in the most recent edition of the *Bataafsche Apotheek*, the practical manual for apothecaries published in 1807. In order to facilitate the daily work of tax officers, Reinwardt, Van Swinden and Vrolik even added a table with the weight of various distilled fluids.[63]

In 1815, Reinwardt eventually participated in a committee which was supposed to organize and survey the introduction of standardized weights and measures in the Dutch kingdom. After two meetings, Van Swinden, Florijn, Vrolik, Paets van Troostwijk, Kraijenhoff and Reinwardt handed in a long report in which they discussed the advantages and disadvantages of a uniform system for trade, the chemical and pharmaceutical industries, and governmental administration. Van Swinden was especially experienced in this field. As a member of a special committee he had been sent by the Batavian Government to Paris in 1798/99 in order to determine the exact length of a meter and the exact weight of a kilo.[64] In their written advice, he and his colleagues now advocated the introduction of the French metric system in the Dutch Kingdom, for it would excel all other

[61] Ibidem, 1810, 9.

[62] Verslag van de Werkzaamheden der eerste Klasse van het Hollandsch Instituut van Wetenschappen, Letterkunde en Schoone Kunsten, uitgebracht in de algemene vergadering des jaars 1814, 6-9, 13-16.

[63] Ibidem, 15.

[64] For a detailed account of the events in Paris: Gillispie, *Science and polity in France,* 458-94.

systems of weights and lengths such as the Rhenish foot and the Amsterdam yard.[65]

The brief review of Reinwardt's activities at the First Class has highlighted his engagement in various commissions which were set up to advise the king's government on specific issues. All commissions documented their investigations in the form of a final report. Some of these were based on joint experimentation carried out in one of the involved apothecary's laboratories while others were the result of intensive discussions among the commission's members.

The First Class as Platform

Apart from work on committees, the First Class offered individual members a platform to promote the 'usefulness' of their specific expertise. For naturalists such as Reinwardt this was an important way to secure their status. In this sense, Reinwardt was no exception in Europe. In a period of political turmoil and institutional instability, many naturalists in France, Britain and Germany used national academies as platforms to brand themselves as 'useful' members of the community and reliable aids to the quickly changing governments. By doing so they hoped to receive one of the rare permanent positions as gardeners, museum directors, or academics in the emerging post-revolutionary national states. Only a few of them, such as the German cameralist Alexander von Humboldt and the British naturalist Joseph Banks (1743-1820) were wealthy enough to pursue their studies without governmental patronage.[66]

In two long lectures on the plant geography of Holland, Reinwardt applied a similar strategy. Reinwardt used these opportunities to demonstrate for his learned listeners the 'usefulness' of *his* approach to nature. It is highly likely that he hoped that the two lectures would be published in the institute's proceedings, which were disseminated throughout the Netherlands and elsewhere in Europe; but that never happened. The lectures only came

[65] Verslag van de Werkzaamheden der eerste Klasse van het Hollandsch instituut van wetenschappen, letterkunde en schoone kunsten, uitgebracht in de algemene vergadering des jaars 1814, 8-17.

[66] For a detailed analysis of naturalists at the *Muséum national d'Histoire naturelle* in Paris in this period, see Spary, *Utopia's garden,* chapter 4 and 5. For a thorough study of the self-fashioning of naturalists affiliated with the botanical garden in Kew, see Drayton, *Nature's government,* chapters 4 and 5.

off the press after his death in 1855, in a volume on the natural history of plants in the Netherlands and its overseas possessions edited by Willem Hendrik de Vriese (1806-1862), Reinwardt's successor as professor of botany in Leiden. They appeared under the title *Proeve eener geographische beschouwing der Flora van Holland* (Proof of a geographical survey of Holland's flora).[67]

Reinwardt's talks had a hybrid origin. On the one hand they were based on his various field observations and measurements carried out in the environs of Amsterdam, Harderwijk and Haarlem. On the other, they were based on chemical analyses of soil probably carried out in his laboratory in Harderwijk. Reinwardt now situated his expertise in the tradition of Carl Ludwig Willdenow (1765-1812), since 1810 director of the botanical garden in Berlin. In order to understand Reinwardt's lectures, it is necessary to briefly shed some light on the figure of Willdenow.

Like Reinwardt, Willdenow had originally been trained as an apothecary. After his years of apprenticeship in the chemical laboratory of Johann Christian Wiegleb in Langensalza (Thuringia), Willdenow continued his studies at the university in Halle. He then moved to Berlin where he first worked as physician. Later he was appointed as public lecturer for botany at the newly founded university there. From 1801, he was also member of the Berlin Academy of the Sciences (Akademie der Wissenschaften).[68]

In 1792 Willdenow published an extensive text on herbology *(Grundriss der Kräuterkunde)*. Willdenow's book, which was meant to illustrate his lectures and classes in Berlin, was divided into several sections: in addition to sections on terminology, plant physiology and an explanation of various classificatory systems, there was a long section on the historical development of vegetation. Willdenow called this branch of botanical inquiry the 'history of plants' ('Geschichte der Pflanzen'). Like his French colleagues, Willdenow stressed the importance of measurable environmental

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[67] C.G.C. Reinwardt, "Proeve eener geographische beschouwing der Flora van Holland. Aanteekeningen betreffende de kruidkundige wetenschap in de nagelaten papieren van den hoogleraar C.G.C. Reinwardt," in *Tuinbouw-Flora van Nederland en zijne overzeesche bezittingen; bevattende de geschiedenis van afbeeldingen van nieuw of merkwaardige planten, bloemen, vruchten. Tweede deel,* ed. W.H. de Vriese, 323-41 (Leiden: A.W. Sythoff, 1855).

[68] For a short biography, see I. Jahn, "Carl Ludwig Willdenow," in *Geschichte der Biologie*, ed. I. Jahn, 993 (Hamburg: Nikol, 2004); and I. Jahn "Carl Ludwig Willdenow und die Biologie seiner Zeit," *Wissenschaftliche Zeitschrift der Humboldt-Universität zu Berlin. Reihe: Mathematik/ Naturwissenschaften* 15 (1966): 803-12.

factors that every analysis of vegetation had to take into account. Only such a perspective enabled one to understand how hurricanes, earthquakes, and volcanoes influenced the earth's vegetation. In order to structure such an analysis, Willdenow proposed to divide Europe into five major floristic regions.[69]

Figure 22: Portrait of Carl Ludwig Willdenow, director of the botanical garden in Berlin, surrounded by plants.

Drawing upon Willdenow's ideas, Reinwardt opened his lecture by embedding the vegetation of Holland in its historical and spatial context. According to Reinwardt, the region contained hardly any 'unique' flora. Botanical experts who travelled through the region would recognize that almost all plants originated from mountainous regions in other parts of Europe which had been shaped earlier in time. Or as Reinwardt put it,

[69] C.L. Willdenow, *Grundriss der Kräuterkunde entworfen zu Vorlesungen* (Berlin: Haude und Spener, 1810), 479-514.

> If we thus agree with the majority of soil experts that all plants being scattered across the entire globe originally stem from plants which emerged after the last alteration of the surface of the earth and after the formation of diluvial mountains (*vlotgebergte*), then one can only assign an original flora to such mountains and our lower and later developed solid land would not include any other plants than [those] that have been transmitted from other countries [where they were] already present from an earlier stage. [70]

In order to understand the geographical distribution of plants in Holland, Willdenow's division of Europe into five floristic regions was, according to Reinwardt, only a fragile starting point. Field investigations in Holland had rather shown that it was hardly possible to separate Europe's vegetation into a northern flora (Denmark, Norway, Sweden, Russia, parts of Britain), a Helvetian flora (Holy Roman Empire, Prussia, Bohemia, Poland, France, the Netherlands), an Austrian flora (Austria, Poland, the Balkans, Hungary, Bulgaria), a Pyrenean flora (Spain, the Balearic Islands, Portugal), and eventually an Apennine flora (Italy, Sardinia, Corsica, and parts of Sicily).[71] While Willdenow placed Holland in the zone of Helvetian flora, for instance, there were also many plants from the northern flora.[72]

Willdenow's categorization, however, provided a framework within which Reinwardt could discuss the reasons why Holland counted fewer plants than for instance countries of the Helvetian, Austrian or Pyrenean flora. A core reason for this shortcoming was, according to Reinwardt, a combination of the unfavourable climatic and geographical conditions in Holland. While mountainous regions such as southern Germany and Austria offered plants a diversified natural environment, Holland's flat landscape,

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[70] Reinwardt, "Proeve eener geographische," 325: "Wanneer wij dus nu al verder, overeenkomstig het gevoelen der meeste aardrijkskundigen vaststellen, dat alle gewassen, welke thans over den aardbodem verspreid zijn, oorspronkelijk afstammen van die gewassen, die, na de laatste algemeene veranderingen der oppervlakte van onzen aardbol en na de vorming van het vlotgebergte op denzelven zijn voortgekomen, dan zal men ook slechts aan dat andere gebergte eene oorspronkelijke Flora moeten toekennen en dit ons lagere, later ontstane vaste land zal geene andere planten kunnen bevatten, dan dezulken, die van andere landen, welke reeds vroeger aanwezig waren, zijn overgebragt."

[71] Willdenow, *Grundriss der Kräuterkunde,* 513-14.

[72] Reinwardt, "Proeve eener geographische," 326.

invariable climate and sandy soil were much less fertile. Yet, despite the small number of plants, Holland could still be considered an important area for plant investigations in Europe.[73]

In the following paragraphs Reinwardt tried to convince his listeners of the uniqueness of the flora in Holland. For despite the unfavourable environmental conditions, the country was still home to a relatively wide variety of plants, especially in as yet unexplored areas, or as he put it:

> Such a huge number in a country which is not that vast, [was] shaped during the last formation, whose elevation differed only slightly from sea level, which is so populated, and continuously farmed, tilled, and [which has not been] left in rest and peace, and where thus plants grown in the wild were often removed as weeds, is for a Dutch herbalist a very pleasant peculiarity.[74]

In his subsequent survey, Reinwardt focused on wild plants that he had detected on sandy soils (*zandgronden*). Since these areas of the country were hardly cultivated, they comprised, according to Reinwardt, the largest number of wild plants. The survey was based on his own field observations and chemical analyses, which he had carried out during his years in Amsterdam, Haarlem and Harderwijk. In the first part of the small survey, Reinwardt described the different plants he had observed and identified in the dunes and heaths he had visited.[75]

In the second part of the survey he added details from his chemical analyses. These had revealed that the mentioned plants, owing to the lack of nitrate (*stikstof*), could not be used for feeding human beings. But as producers of carbon (*koolstof*), they were responsible for the constitution of an underground layer which comprised iron and was commonly called primordial or ochre sand (*oer-* or *okerzand*). Similar and even more concentrated layers could be found at deeper levels. Reinwardt characterized

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[73] Ibidem, 328-30.

[74] Ibidem, 330: "Een zoo groot aantal in een land van eene niet zeer groote uitgestrektheid, van de laatste formatie, wiens hoogte zo weinig van het waterpas der zee afwijkt, hetwelk zoo zeer bevolkt is, en gedurig geroerd, bebouwd, of althans niet in rust en aan zich zelve overgelaten wordt, en alwaar dus de in het wild groeijende gewassen veelvuldig als onkruid uitgeroeid worden, is een voor den Nederlandschen kruidkundige zeer aangename bijzonderheid."

[75] Ibidem, 332-35.

these deeper ore layers as follows: "[T]hey are sometimes so compressed that they have been converted into a rock-hard substance . . .".[76] By referring to the French chemists and geologists Fourcroy and Barthélemy Faujas de Saint-Fond (1741-1819), Reinwardt concluded his survey with the general statement that ore layers in sandy areas must be the outcome of a complex interaction between plants, soil, water and air.[77]

This brief discussion of Reinwardt's lectures at the First Class in Amsterdam shows how he used the institution as a platform to promote the 'usefulness' of his approach to nature. By summarizing and combining the results of his field observations and his chemical analyses in the laboratory in Harderwijk, he established a close connection between the search for ore layers and his own expertise as a field naturalist. Since the Netherlands lacked important natural resources (e.g. pit coal/*steenkool*), Reinwardt's conclusion that sandy areas comprised ore layers was clearly directed towards high-ranked administrators in Amsterdam and The Hague.[78]

Conclusion

By following Reinwardt to Haarlem and Amsterdam, this chapter has shown that 'sociability' formed an alternative route to patronage to forge a career. Since the Jardin du Roi never developed as a platform for botanical investigation, the naturalist Reinwardt switched to another well-established vehicle in Dutch society: the learned society. Since the middle of the eighteenth century, forums such as the Dutch Society of Sciences had developed into vital platforms where local notables and learned amateurs socialized with the aim of improving the country's economy and society. Reinwardt's key to these learned circles was Martinus van Marum, with whom he shared a deep interest in botany and experimental chemistry. Owing to his strong utilitarian approach, Van Marum was able to advance to an influential advisor under Louis Napoleon. For Van Marum the young Reinwardt was an ideal companion to enrich and enlarge his private garden,

[76] Ibidem, 338: "[Z]ij zijn somtijds zoo zeer zamengebakken, dat zij tot eene bijna steenharde zelfstandigheid zijn overgegaan. . . ."

[77] Ibidem, 340-41.

[78] For more information on mining in the nineteenth century, see B.P.A. Gales, "Delfstoffen, Machine- en Scheepsbouw," in *Geschiedenis van de techniek in Nederland*, vol. 4, *De wording van een moderne samenleving 1800-1890*, ed. H.W. Lintsen, 11-35 (Zutphen: Walburg Pers, 1993).

Plantlust, on the outskirts of Haarlem. Even after Reinwardt's appointment as extraordinary professor of chemistry and herbology in Amsterdam, he and Reinwardt remained in close contact. As members of the Royal Institute's First Class in Amsterdam they regularly attended meetings and wrote reports on issues related to their expertise. Beside joint investigations, the First Class offered naturalists such as Reinwardt to promote their 'usefulness' in the form conversations and lectures. The discussion of one of these lectures has shown how Reinwardt artistically applied his field observations to the needs of the Dutch and French administrators in Amsterdam and The Hague.

In the end, Reinwardt's attempts to fashion himself as a 'useful' naturalist with a strong interest in experimental chemistry and field observation bore fruits. In December 1814, he received a long letter from Anton Reinhard Falck, now secretary of the newly appointed king Willem I (1772-1843). Reinwardt knew Falck from his years as an apprentice in Amsterdam, when both were members of Libertate et Concordia. In his letter, Falck praised the naturalist's broad expertise and offered Reinwardt a well-paid position as advisor to the colonial government in the Netherlands Indies. For Reinwardt, the new position was an ideal occasion to prove himself once more as a reliable aide to a new regime. Reinwardt secretly hoped that his efforts in the colonies would be rewarded in the form of a prestigious professor- or directorship, which would in turn allow him to transform his field observations and measurements into splendid publications. As the following chapters show, none of these hopes was fulfilled. Governing and investigating Java and the neighbouring islands turned out to be a much more complex endeavour than any of the parties involved anticipated. And his subsequent attempt to fashion himself as a fearless and measuring traveller in the Netherlands by publishing a travel narrative and a *Flora Javae* never materialized. Other figures such as the British administrator Sir Thomas Stamford Raffles (1781-1826), the American apothecary and collector Thomas Horsfield (1773-1859), the Dutch ornithologist and owner of a large private cabinet Coenraad Jacob Temminck (1778-1858), the German physician Philipp Franz Balthasar von Siebold (1796-1866), and even Reinwardt's assistant, Carl Ludwig Blume (1796-1862), were quicker and much more talented in selling their expertise to their superiors and the growing numbers of readers in Europe.

PART II

Malay Archipelago

4

A Hybrid Traveller in the Malay Archipelago

Well equipped schools were missing, even in densely populated cities, and the few existing [schools] here and there were run by teachers who, without having passed any exam, have chosen their profession arbitrarily and, given the lack of any supervision, guidance, reprimand or necessary tools, didn't even possess basic skills such as the Dutch language.

Reinwardt in an account on the school system on Java drafted in late 1819.[1]

In October 1815, Reinwardt boarded the warship *Admiraal Evertsen* in the roadstead of Texel.[2] The fleet of seven ships bound for the Indies carried high civil servants and approximately 3000 soldiers and other personnel who had been selected to constitute a new colonial administration of Java and the neighbouring islands.[3] Head of the new colonial government was Godert Alexander Gerard Philip, baron van der Capellen (1778-1848) who, like

[1] De Vriese, *Reinwardt's reis,* 249: "[Z]elfs de meest volkrijke steden misten wel ingerigte scholen, en de weinige hier en daar nog bestaande scholen werden door onderwijzers gehouden, die, zonder afgelegd examen, willekeurig dien stand gekozen hadden en bij het gemis van opzigt, leiding, teregtwijzing en noodige hulpmiddelen, tevens veelal de meest noodzakelijke kundigheden, zelfs die der Nederduitsche taal, niet bezaten."

[2] UB Leiden, BPL 2425, V, travel diary Reinwardt, entry 16 October 1815.

[3] P.H. van der Kemp, *De teruggave der Oost-Indische koloniën. 1814-1816* ('s-Gravenhage: Martinus Nijhoff, 1910), 123-244 and 322-26.

Reinwardt, had pursued a steep career in the aftermath of the Batavian Revolution. After study in Utrecht and Göttingen, Van der Capellen first served as a civil servant in Utrecht and Eastern Friesland. During the reign of Louis Napoleon, he was appointed minister for the interior. Willem I, in turn, appointed Van der Capellen minister for trade and colonies and sent him on a diplomatic mission to Brussels and Vienna where he was involved in the complex post-Napoleonic negotiations between Britain, Russia, Austria and Prussia.[4]

Figure 23: Portrait of the new Governor General G.A.G.P. Van der Capellen, by Cornelis Kruseman (1797-1857).

One of the central issues in these negotiations was the future of Belgium. British Foreign secretary Robert Stewart Castlereagh (1769-1822) was especially insistent that Belgium merge with the Netherlands to protect the North Sea Coast from French influence. In order to advance this

[4] On Van der Capellen's education and early career, see Stevens, *Van der Capellen's koloniale ambitie*, 8-29.

proposition, Castlereagh offered Willem I and his advisors to return some of the former Dutch possessions in Southeast Asia which the British had conquered in the aftermath of the Batavian Revolution in 1795 and during the Napoleonic wars; Java did not fall into British hands until 1811.[5] After a period of tenacious negotiations, the parties reached an agreement, and in August 1814 emissaries of both countries signed the Treaty of London (*Tractaat van Londen*) according to which the Dutch regained Suriname, Java, Sumatra, and the Moluccas from the British; the former Dutch settlements in the Caribbean, the Cape, India and Ceylon remained in British hands. In order to compensate the Dutch for this territorial loss, British diplomats also offered to return the island of Bangka, with its invaluable tin resources. Moreover, both parties agreed that merchants from both nations should be allowed to trade in each other's colonial territories.[6]

The actual transfer of the possessions in the Malay Archipelago was to be carried out by a General Committee (*Commissie generaal*) which Willem I established in late 1814. Despite the doubts of one his most important advisors, Gijsbert Karel van Hogendorp (1762-1834), the king appointed Van der Capellen—who had no expertise in colonial affairs—as head of the new committee. The advice of Anton Reinhard Falck, the king's secretary, apparently tipped the scale here. Other members of the general committee were Cornelis Theodorus Elout (1767-1841) and the former commander of the Dutch fleet in Asia, Arnold Adriaan Buyskes (1771-1838). The General Committee should remain active until all possessions had been transferred from the British to the Dutch. After the dissolution of the committee, Van der Capellen was designated to stay in Java as Governor General.[7]

The instructions and regulations for the General Committee were prepared in the autumn of 1814. Although Willem I was sovereign in colonial affairs, it took several months to develop the documents which provided the committee with concrete guidelines for their work in the

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[5] J. van Goor, *De Nederlandse koloniën. Geschiedenis van de Nederlandse expansie, 1600-1975* (Den Haag: SDU Uitgeverij, 1994), 171-92.

[6] N.C.F. van Sas, *Onze natuurlijkste bondgenoot. Nederland, Engeland en Europa, 1813-1831* (Groningen: Wolters Noordhoff-Bouma's Boekhuis, 1985), 79-95.

[7] On the appointment of the General Committee, see Stevens, *Van der Capellen's koloniale ambitie,* 62-67. On Buyskes' years as surveyor and naval officer see K. Zandvliet, "Daendels en de nieuwe kaart van Java," in *Herman Willem Daendels, 1762-1818*, ed. F. van Anrooij, et al. (Utrecht: Matrijs, 1991), 79.

colonies.[8] In the end, the regulations were drafted by the members of the Council of State (Raad van State) and the Council of Trade and Colonies (Raad van Koophandel en Koloniën), established in April 1814. Head of the latter institution was the former Minister for the National Oeconomy Johannes Goldberg, whom the king esteemed for his economic expertise. Goldberg was one of the few patriots who belonged to the king's inner circle of advisors.[9]

In October 1814, Goldberg presented to the king a conceptual version of the regulations and a longer report on how trade and the administration of the Netherlands Indies should be organized. Similar to other colonial thinkers such as Dirk van Hogendorp (1761-1822) and his more moderate brother Gijsbert, Goldberg considered Java and the neighbouring islands an essential and, potentially, economically valuable part of the Dutch nation.[10] In order to guarantee its profitability, Goldberg and Van Hogendorp advocated a gradual liberalization of the Dutch trading system in the Malay Archipelago. Instead of shipping all colonial products to Amsterdam, as the merchants of the East India Company had done in the two centuries before, Goldberg advised the king to slowly liberalize the market in Batavia for the fast-growing number of American and British traders in the region.[11] Only clove, nutmeg, mace, opium and tea were to be exclusively sold in Amsterdam.[12]

After some deliberations in the Council of State, the king followed Goldberg's suggestion and decreed the new regulations in early January

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[8] P.J. Platteel, *De grondslagen der constitutie van Nederlandsch-Indië. De wording van het regeerings reglement van 1815* (Utrecht: N.V. A. Oosthoek's Uitgevers-Maatschappij, 1936), 70; and Van der Kemp, *De teruggave der Oost-Indische koloniën*, 163-244. For a more recent account on the genesis of the regulations, see N.S. Efthymiou, "De organisatie van regelgeving voor Nederlands Oost-Indië: stelsels en opvattingen (1602-1942)" (PhD thesis, University of Amsterdam, 2005), 158-72.

[9] Zappey, *De economische en politieke werkzaamheid*, 93.

[10] For detailed survey of patriot visions on the colonies, see G.J. Schutte, *De Nederlandse patriotten en de koloniën. Een onderzoek naar hun denkbeelden en optreden, 1770-1800* (Groningen: H.D. Tjeenk Willink, 1974); and Efthymiou, *De organisatie van regelgeving*, chapter 2.

[11] On the growing importance of American merchants in the region, see J.R. Fichter, *So great a proffit. How the East Indies trade transformed Anglo-American capitalism* (Cambridge: Harvard University Press, 2010), chapters 3-6; and L. Blussé, *Visible cities. Canton, Nagasaki, and Batavia and the coming of the Americans* (Cambridge: Harvard University Press, 2008), 60-64.

[12] Zappey, *De economische en politieke werkzaamheid,* 118-21.

1815.[13] Since detailed information about the exact economic and political state of Java and the neighbouring islands was lacking, the promulgated regulations offered only a vague framework for how the colonies should be administered. It is therefore not surprising that Goldberg, Elout and Buyskes suggested that the king appoint the expert for agriculture and processing industries, Reinwardt, as general advisor to the General Committee. Willem I followed the recommendation and attached Reinwardt to the committee in the same month.[14]

This chapter aims to provide a reconstruction of the early phase of the General Committee's fieldwork in and around Batavia. In particular the reforms of the former Governor General Herman Willem Daendels (1762-1818) and his British successor Sir Thomas Stamford Raffles had transformed the city and its suburb Buitenzorg into a nodal point for colonial governance and science. As the former administrative heart of the Dutch East India Company's trading empire, the city also functioned as trading hub in the far-flung Malay Archipelago.[15] Despite its unhealthy environment, European and indigenous merchants regularly called at Batavia's harbor to load and unload cargo not only from Sumatra, Borneo, Celebes, the Moluccas, and the Lower Sunda Islands, but also from India, Malaysia, China, Brazil, America, the Philippines and Japan. Batavia and its suburbs thus constituted important sites where trade and politics-related information from all over the Malay Archipelago and even beyond was exchanged.[16]

Owing to his position as general advisor to the General Committee, Reinwardt could thus rely on a large network of informants who provided him with statistical and other data about the islands' administration, nature and economy. Reinwardt used this information to get a general overview of

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[13] The full title of the regulations is: *Reglement op het beleid van de regeering, het justitiewezen, de cultuur en den handel in 's lands Aziatische bezittingen*.

[14] UB Leiden, BPL 2425, 3, Royal decision 11 January 1815.

[15] For a concise overview of the administrative infrastructure in Java in 1814, see H.W. van den Doel, *De stille macht. Het Europees binnenlands bestuur op Java en Madoera, 1808-1942* (Amsterdam: Uitgeverij Bert Bakker, 1994), 27-46; and Stevens, *Van der Capellen's koloniale ambitie*, 43-55.

[16] On the unfavorable environmental conditions of the city, see P.H. van der Brug, *Malaria en malaise: De VOC in Batavia in de achttiende eeuw* (Amsterdam: De Bataafsche Leeuw, 1994). For an overview of the trading networks in the region, see H. Dick, "State, nation-state and national economy," in *The emergence of a national economy. An economic history of Indonesia, 1800-2000*, ed. Howard Dick, et al., 15-19 (Leiden: KITLV Press, 2002).

the colony's current status. The bulk of the collected data was meant to serve as the basis for a detailed statistical report and a travel narrative to be compiled after his return to the Netherlands. Moreover, it provided him a platform to initiate reforms of Java's public health and educational system. Like his Batavian predecessors in the Netherlands, Reinwardt installed civil servants tasked with surveying and advancing the daily practice of teachers, physicians, surgeons and apothecaries in the various districts of the colony. The inspectors had to regularly dispatch reports to Batavia. In order to improve the colony's agriculture, Reinwardt also established a botanical garden in Buitenzorg. Owing to vital colonial networks, the garden quickly developed into an important platform for the acclimatization of rare and economically rewarding plants, trees, and herbs. Van der Capellen even dreamt of transferring the entire production of spices from the Moluccas to Java, in order cut costs for the administration of the remote islands.[17] Although many of these initiatives remained in a fledgling state, they formed an important incentive for the rise of a 'modern' colonial bureaucracy in Java in the course of the nineteenth century.

A Hybrid Traveller

In the months before Reinwardt's departure it was in particular Goldberg who further defined his tasks.[18] During a meeting in the offices of the Council of Trade and Colonies at the 'Fluwelenburgwal' in The Hague in February 1815, Goldberg asked Reinwardt whether he would be willing to gather statistical data during his stay in Java and the neighbouring islands. Goldberg and the king expected Reinwardt to summarize his findings in the form of a detailed report after his return.[19] In order to structure Reinwardt's survey, Goldberg offered Reinwardt a long list of questions which he considered crucial for his journey through the Malay Archipelago. Similar to Goldberg's earlier surveys which he had carried out as Agent van de Nationale Oeconomie (1799-1801), the questionnaire for Reinwardt touched upon a variety of topics. The 120 questions were grouped under

[17] H.T. Colenbrander, ed., *Gedenkschriften van Anton Reinhard Falck* ('s-Gravenhage: Martinus Nijhoff, 1913), 468: Letter Van der Capellen to Falck, Sourabaya, 8 July 1817.
[18] Zappey, *De economische en politieke werkzaamheid*, 95-104.
[19] NA The Hague, collectie Reinwardt, inv. 1: Letter Goldberg to Commissarissen generaal, 25 March 1815.

geography, population, (export) products, processing of raw material, trade and, eventually, arts and sciences. Among the questions were:

> [What is the] size of the cultivated land? Size of the forests and uncultivated areas? Natural characteristics, size and further curiosities or a general description of the mountains? Size of inland waters and their status in particular regarding shipping? . . . What is the current state of the salt production? Is there any production of saltpetre, and is it of any importance? Are there stone, coal or iron mines on Java (or on the neighbouring islands) as some writers suggest? What is the status of the forests and is the wood appropriate for the construction of ships? Are there other sorts of wood available that are important for commerce such as dyewood, fine lumber, sandalwood from Timor, sappanwood from Bima or 'calliatour' wood, etc.? . . . How much coffee is produced each year, is the quality even or does it vary, which quantity is consumed within the colony? . . . How many arrack distilleries are there? How much arrack is produced annually? . . . Has the export [of arrack] to the British possessions declined or not, and if it has, what are the reasons for the decrease? . . . What is the current state of trade with Europe and the United States? . . . What is the present state of child-rearing and the educational system?[20]

[20] De Vriese, *Reinwardt's reis,* 37-48: "Uitgestrektheid van het gecultiveerde land? Uitgestrektheid der bosschen en woeste landstreken? Natuurlijke gesteldheid, uitgestrektheid en verdere merkwaardigheden of eene algemeene beschrijving der gebergten? Oppervlakte der binnenlandsche wateren, derzelver staat, vooral in de betrekking tot de scheepvaart? . . . Hoedanig is de staat der planten, en is het hout geschikt voor den scheepsbouw? Zijn er ook andere soorten van hout, welke voor den koophandel belangrijk zijn, b.v. verwhout, fijn werkhout, sandelhout op Timor, sappanhout van Bima, calliatour-hout en andere. . . . Hoeveel koffij wordt er 's jaarlijks wel ingeoogst, en is dezelve van gelijke of verschillende qualiteiten, hoeveel wordt daarvan binnen 's lands verteerd? . . . Hoeveel arak-stookerijen zijn er? Hoe groot is de jaarlijks gewonnen quantiteit arak?. . . Is de uitvoer naar de Engelsche bezittingen in Oost-Indië verminderd of niet, en zoo ja, welke zijn de oorzaken dezer vermindering?. . . In welke staat bevindt zich de Koophandel op Europa en Noord-Amerika?. . . Welke is de toestand van de opvoeding en het schoolwezen?" The individual numbers of the quoted questions have been removed.

Apart from his function as surveyor and advisor to the General Committee, the king obliged Reinwardt to use his field trips to collect rare natural historical specimens for the State Cabinet of Natural History ('s Lands Kabinet van Natuurlijke Historie), which was stored in the building of the Royal Academy of Sciences at the Kloveniersburgwal in the centre of Amsterdam and of which Reinwardt was director from its establishment in 1810.[21]

In order to fulfil his wide-ranging tasks, Reinwardt was awarded the title Director of Agriculture, Arts and Sciences of Java and the neighbouring islands (Directeur tot de zaken van landbouw, kunsten en wetenschappen op Java en de naburige eilanden).[22] Moreover, he received a generous annual salary of 24.000 guilders, which far exceeded his salary as professor at the Athenaeum Illustre in Amsterdam. Even Goldberg's salary of 10.000 guilders per annum was much lower.[23] Reinwardt was also endowed with an extra sum of 1.500 guilders in order to buy scientific equipment for his journey to the Dutch colony.[24] Additionally, the king allowed Reinwardt to appoint two qualified assistants to help him on his investigations in the field.[25] And eventually, Willem I promised Reinwardt to keep his professorship at the Athenaeum Illustre and his directorate of the State Cabinet vacant until his return from the Netherlands Indies.[26]

This brief discussion of Reinwardt's instructions has shed light on the hybridity of his identity as traveller. First, he was supposed to survey the colony's economy and agriculture by using Goldberg's questionnaire. Second, he was tasked with improving the education of European civil servants and the medical care in hospitals and apothecaries. And third, Reinwardt was ordered to collect plants, animals and minerals in order to develop the State Cabinet in Amsterdam into a prestigious and diverse natural historical collection.

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[21] L.B. Holthuis, *1820-1958: Rijksmuseum van Natuurlijke Historie* (Leiden: Nationaal Natuurhistorisch Museum, 1995), 14-15.

[22] UB Leiden, BPL 2425, 3, Royal decision 11 January 1815. Article 1.

[23] Zappey, *De economische en politieke werkzaamheid*, 101.

[24] UB Leiden, BPL 2425, 3, Royal decision 11 January 1815. Article 9 and 11.

[25] Ibidem, article 12.

[26] Ibidem, article 7 and 8.

Sailing to the East

Reinwardt's journey to Batavia took nine months. On board the *Admiraal Evertsen*, Reinwardt carried a small library and a large amount of chemical and physical instruments such as various-sized bulbs, barometers, thermometers, eudiometers (for measuring changes in the volume of gas), an air pump, a metal detector, a clock, drawing paper, and a bathometer made by his colleague Abraham van Stipriaan Luiscius.[27] Like other travelling naturalists, he kept a travel diary in which he recorded weather observations, the ship's position, his daily activities and copies of letters to his friends and colleagues back in the Netherlands. Reinwardt regularly corresponded with his family in Lüttringhausen and with his friends and colleagues in Amsterdam, Utrecht and Haarlem, such as Anthoni d'Ailly and his son Anthony Johannes d'Ailly (1793-1851), Jeronimo de Vries, David Jacob van Lennep, Cornelis van Vollenhoven, Johan Melchior Kemper, Nicolaas Cornelis de Frémery, and of course Martinus van Marum.[28] Reinwardt often enclosed small presents such as plant seeds, small landscape sketches, candles, baskets, and boxes with ginger roots and fruits. Sometimes he asked his friends to forward the presents to his family in Lüttringhausen.[29] His friends, in turn, sent him copies of recently published books, newspaper articles, recent issues of scientific journals or special paper for mounting his collection of dried plans.[30]

Reinwardt knew the above-mentioned persons from his years as chemist-apothecary, gardener and professor in Amsterdam, Harderwijk and Haarlem. Anthoni and Anthony Johannes d'Ailly ran a pharmacy and chemical workshop in Amsterdam. Reinwardt had become acquainted with De Vries, Van Lennep, Van Vollenhoven and Kemper during his years as a student at the Athenaeum Illustre in the late 1790s. All of them belonged to a group of friends who regularly came together to discuss politics and literature in one of Amsterdam's literary societies. With Van Marum, Reinwardt shared a deep passion for the cultivation of exotic plants, plant

[27] De Vriese, *Reinwardt's reis*, 50.

[28] UB Leiden, BPL 2425, inv. 5. For detailed excerpts of many of Reinwardt's letters, see Van Heiningen, *The Correspondence of Caspar Georg Carl Reinwardt.*

[29] See, for instance, NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Batavia, 15 December 1816; and Batavia, 9 April 1817 or KB The Hague, 121 B 8, letter Reinwardt to De Vries, Batavia, 15 June 1817.

[30] See, for instance, NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Buitenzorg, 6 February 1818; and KB The Hague, 121 B 8, letter Reinwardt to De Vries, Batavia 20 May 1818.

physiology and experimental chemistry, the last of which was likely the link between Reinwardt and Frémery, since 1795 professor for medicine, chemistry, pharmaceutics and natural history at Utrecht University. Like Reinwardt, Frémery promoted the application of the 'new' chemistry in an industrial and medical context. In 1808, Frémery finished a Dutch translation of Jean Antoine Chaptal's (1756-1832) book *La Chimie appliquée aux arts* which Reinwardt had begun but never managed to finish owing to his various administrative and academic duties in Harderwijk.[31]

Before the General Committee reached Java by the end of April 1816, the convoy made two long stops, one on the Cape Verde islands and the other at Cape of Good Hope. During both layovers, Reinwardt studied the local climate and geography as well as the political and economic situation at the two places. The manifold observations and measurements recorded in his travel diary comprised detailed information on the fertility of the soil, the number of cattle, descriptions of unknown plants, and the quality of local agricultural products such as cheese, chickens, and oranges. Reinwardt summarized his observations in a letter to his friend Van Marum in Haarlem as follows: "The vegetation is entirely unknown to me, so you easily understand that I was stunned by that when I set foot ashore."[32] Besides his own observations, he frequently contacted and exchanged information with local gardeners, plantation owners, apothecaries, missionaries, farmers, and civil servants.[33] These local contacts also allowed him to carry out a longer tour of the hinterland of Cape Town.[34]

Reinwardt's draftsmen Adrianus Johannes Bik (1790-1872) and his brother Jannes Theodorus Bik (1796-1875) used such short trips to document the landscape and vegetation in the form of watercolour sketches. Reinwardt's notes also included a detailed description of how the Cape's economy could be further improved. Since the region did not possess enough fossil fuels, it would hardly be possible to establish a processing industry there, so Reinwardt advised local administrators to build new roads and bridges to stimulate the cultivation and trade of cash crops, fodder plants and

[31] MM The Hague, letter Reinwardt to Meerman, 25 Augustus 1807.

[32] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Port Praya, 25 November 1815: "De vegetatie is geheel vreemd, en gij begrijpt ligt hoezeer mij dat trof toen ik voet aan waal zette."

[33] See for instance, UB Leiden, BPL 2425, inv. 5, entry 9 January 1816.

[34] Ibidem, entries 16 and 17 January 1816 and KB The Hague, 121, B 8, letter Reinwardt to De Vries, Kaapstadt, 10 January 1816.

wood.[35] This brief analysis of Reinwardt's early entries in his travel diary allows a first glance on his work in the field. In order to fulfil his instructions, Reinwardt and his helpers heavily depended on the knowledge and skills of a large number of people with local knowledge.

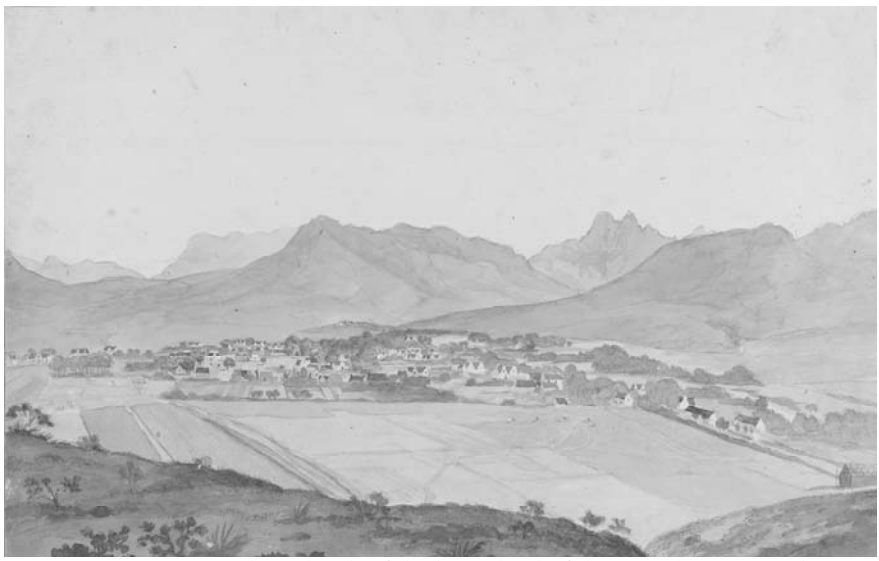

Figure 24: Watercolour sketch of the hinterland of the Cape by Reinwardt's draughtsman Adrianus Johannes Bik (1790-1872).

Approaching the Social Worlds of Batavia

Reinwardt and the other members of the General Committee arrived in Batavia at the end of April 1816. Since the transfer of the colonies from the British to the Dutch colonial administrators took longer than expected, Reinwardt had no official duties for several months.[36] He therefore used his time to engage with Batavia's administrative elite. Many of them fostered the hope that the new colonial government would appoint them to high administrative positions. For Reinwardt, contact with many of these persons was thus an ambiguous endeavour. He depended on their administrative

[35] UB Leiden, BPL 2425, inv. 5, entry 3-9 February 1816.

[36] For a detailed overview of the complex negotiations between British and Dutch administrators *in situ*, see N. Tarling, *Anglo-Dutch rivalry in the Malay world 1780–1824* (London: Cambridge University Press, 1962); and P.H. van der Kemp, *Oost-Indië's herstel in 1816* ('s-Gravenhage: Martinus Nijhoff, 1911), 63-114; and Van der Kemp, *De teruggave der Oost-Indische koloniën*, 334-401.

experience and social networks, but at the same time he had to maintain a critical distance, because many of them saw any change in the colony's administration as a threat to their economic interests and political influence. It is therefore not surprising that his letters to the Netherlands sometimes contained critical comments about the lifestyle of Batavia's wealthy elite. In a letter to De Vries, Reinwardt in particular complained about the daily life of women who were always surrounded by a large number of servants and slaves.[37]

Reinwardt was first lodged in the spacious house of the IJsseldijk family at Rijswijk, ten kilometres south of the old town of Batavia. The IJsseldijks belonged to a clique of conservative families who had played an important role in the colonial bureaucracy in Java since the end of the eighteenth century. Wouter Hendrik van IJsseldijk (1755-1817) had served as district officer (*resident*) in Yogyakarta in central Java and later as extraordinary member of the Council of the Indies (Raad van Indië). Almost all these families possessed large private estates in the hinterland of Batavia. As a so-called 'oudgast'[38] IJsseldijk was rather critical about all changes in the colonial administration. He instead adhered to the ideals and administrative practices of the former Dutch East India Company.[39]

Nonetheless, together with the IJsseldijks and other colonial administrators Reinwardt carried out short field trips in the vicinity of Batavia to such places as the Kampung Molucca, Cilodong, Kramat, Grogol and Tangerang. In Kramat, Reinwardt visited a coffee plantation belonging to one of IJsseldijk's friends.[40] In Grogol and Tangerang, he inspected an oil and sugar mill and an indigo factory.[41] The sugar mills were often rented and run by Chinese.[42] Until the introduction of the cultivation system (cultuurstelsel)

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[37] See, for instance, KB The Hague, 121 B 8, letter Reinwardt to De Vries, Tjilodong, 25 May 1816.

[38] The Dutch term 'oudgast' refers to a clique of high-ranked and privileged East India Company officials who had established powerful family networks in Java. Even after the fall of the East India Company many of them stayed on the island and tried to secure their privileges.

[39] Stevens, *Van der Capellen's koloniale ambitie*, 78-83; and, more generally, J.G. Taylor, *The social world of Batavia. Europeans and Eurasians in colonial Indonesia* (Madison: University of Wisconsin Press, 2009), 71-75, 119-23.

[40] UB Leiden, BPL 2425, inv. 5, entry 30 April and 1 May 1816 and entries 6-9 May 1816.

[41] Ibidem, entry 12 July 1816 and 17 and 18 July 1816.

[42] G.R. Knight, "Estates and plantations in Java 1812-1834" (PhD thesis, University of London, 1968), 55-56.

in 1830, these wealthy private landowners and entrepreneurs formed an important group in Java. Various influential liberal thinkers and administrators in the Netherlands and in Batavia—Van der Capellen and Elout were two of them—had long believed that such private agricultural enterprises would be essential to Java's development as a financially rewarding enterprise. In the course of their stay on Java, however, the General Commissioners gradually changed their mind, especially after they heard reports about inhumane work conditions that sometimes sparked local uprisings. In 1819, they decided to forward this issue to Willem I in the Netherlands, but he was reluctant to make a decision with the result that later Elout and Van der Capellen were heavily criticized for their laxness in stimulating private agricultural and other entrepreneurial activities in Java.[43]

In this early stage, Reinwardt also met another influential official in the social world of Batavia, Nicolaus Engelhard (1761-1831), the former governor of Java's Northeast Coast and the owner of large estates in Buitenzorg and the Preanger region.[44] Engelhard had amassed a large amount of natural historical items, books, drawings, antiquities and manuscripts which he stored in his spacious house at Rijswijk.[45] From Engelhard, Reinwardt eventually received the botanical and zoological notes of the French naturalist Jean Baptiste Leschenault de la Tour (1773-1826), who had stayed at Engelhard's house in Semarang between 1803 and 1806.[46]

Reinwardt also became acquainted with the president of the Batavian Society of Arts and Sciences (Bataviaasch Genootschap van Kunsten en Wetenschappen), the military commander Balthazar Frederik Wilhelm, baron von Lutzow (†1822). Since its foundation in 1778, the society had offered Batavia's small merchant elite an important platform to come together and converse about various topics.[47] Like its counterparts in the Netherlands, the Batavian Society occasionally launched essay competitions

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[43] Knight, "Estates and plantations," 18; Stevens, *Van der Capellen's koloniale ambitie,* 113-62; and B. de Prins, *Voor Keizer en Koning. Leonard du Bus de Gisignies. 1780-1849. Commissaris-generaal van Nederlands-Indië* (Amsterdam: Uitgeverij Balans, 2002), 104-10.

[44] Knight, "Estates and plantations," 137.

[45] F. de Haan, *Priangan. De Preanger-Regentschappen onder het Nederlandsch Bestuur tot 1811*, vol. I (Batavia: Bataviaasch Genootschap van Kunsten en Wetenschappen, 1910), 85.

[46] UB Leiden, BPL 2425, inv. 5, entry 13-17 May 1816; and J. Bastin, *The natural history researches of Dr Thomas Horsfield (1773-1859). First American naturalist of Indonesia* (Singapore: Oxford University Press, 1990), 20-22.

[47] Taylor, *The social world of Batavia,* 85-87; and H. Groot, *Van Batavia naar Weltevreden. Het Bataviaasch Genootschap van Kunsten en Wetenschappen, 1778-1867* (Leiden: KITLV Uitgeverij, 2009), 63-155.

on natural historical, agricultural, historical, and economic topics, and the more noteworthy submissions and other articles were published in the society's proceedings, which appeared only irregularly. The Fourth Anglo-Dutch War had brought the society's activities to a halt in the early 1780s when, due to the lack of paper and other printing material, the fourth volume of the proceedings appeared only in handwritten form. The sixth volume of the proceedings did not appear until 1792. Twenty-four years later, the president of the Batavian Society informed Reinwardt that the eighth volume of the proceedings would appear soon.[48]

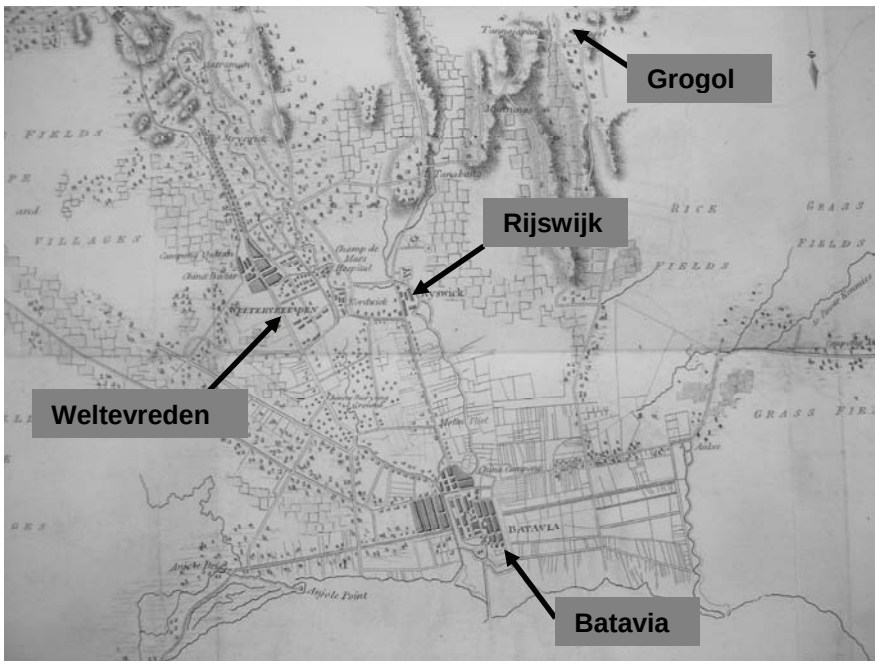

Figure 25: The port city of Batavia and southern suburbs.

Meanwhile Reinwardt and his botanical assistant William Kent used their time to learn Malay and to collect and describe grasses, lichens, parts of trees, and flowers. Reinwardt knew Kent from his years as professor in Harderwijk where the latter had assisted Reinwardt as gardener and as assistant in the university's chemical laboratory.[49] By the end of June 1816,

[48] UB Leiden, BPL 2425, inv. 5, entry 2 May 1816.

[49] On Kent and the Bik brothers, see M.-O. Scalliet, *Antoine Payen. Peintre des Indes Orientales. Vie et écrits d'un artiste du XIXe siècle (1792-1853)* (Leiden: CNWS, 1995),

Reinwardt noted in his diary that the two of them had already added 130 new plant specimens to his private herbarium.[50] Reinwardt also carried out barometric measurements to calculate the height of nearby mountains. These measurements were necessary to calibrate other instruments in the new environment. In order to be able to compare the results with later measurements, Reinwardt noted the results in his travel journal.[51]

During the first months of his stay in Java, the General Committee and Reinwardt were confronted with a dilemma. On the one hand, they depended heavily on the expertise and influence of individuals and families who before the reforms of Daendels had played an influential role in the colony's administration. On the other hand, the General Committee and Reinwardt had to distance themselves from these so-called 'oudgasten' who feared that changes in the colony's administration would further erode their family's wealth, status and privileges. Many of them had made fortunes by leasing large parcels of land in the hinterland of Batavia where they forced Javanese peasants to cultivate crops such as coffee and rice.

Organizing Batavia and the Surrounding Areas

In August 1816, British Lieutenant-Governor John Fendall (1762-1825), handed Java over to the Dutch.[52] One day after the change of regime, Reinwardt left the house of the IJsseldijk family and moved to a place close to the houses of Elout and Van der Capellen in Rijswijk. In the months to come, Reinwardt was a frequent guest in the houses of high-ranking officials.[53] In October 1816, the General Committee informed the subordinate district officers in a printed circular letter about Reinwardt's appointment as Director of Agriculture, Industry and Arts. From now on, the provincial administrators were obliged to supply Reinwardt and his helpers with accurate statistical and other information.[54]

583-84; and M.-O. Scalliet, "Beelden van Oost-Indië: de collectie Bik in het Rijksprentenkabinet," *Bulletin van het Rijksmuseum* (2001): 345-8.

[50] UB Leiden, BPL 2425, inv. 5, entry 29 June 1816.

[51] Ibidem, entry 2 July 1816.

[52] Ibidem, entry 19 August 1816.

[53] KB The Hague, 121 B 8, letter Reinwardt to De Vries, Rijswijk, 14 September 1816.

[54] NA The Hague, Ministerie van Koloniën, 1814-1849, inv. 2435, decision 23 October 1816.

In the months after his appointment as Director of Agriculture, Industry and Arts, Reinwardt hardly found time to continue his investigations of Java's nature and geography. While Elout and Van der Capellen tried to get an overview of the political and economic situation in the various districts of Java,[55] Reinwardt started reorganizing the school and public health systems in Batavia and the surrounding areas. In the optic of Reinwardt, who had been socialized in a culture where improvement, standardization and measurement formed the core tools to improve society and economy, the situation on Java seemed more than chaotic.[56] In order to improve the situation, Reinwardt obliged district officers in the different provinces to look for and propose qualified candidates who could be employed as teachers in government schools. Moreover, he installed several school inspectors (*schoolopzieners*) who were asked to survey schools in their respective district. The General Commissioners also followed Reinwardt's advice to establish a primary school in Weltevreden, ten kilometres south of the old centre of Batavia. According to Reinwardt's plans, four permanently employed teachers were needed to teach around 160 European pupils. Indigenous pupils were not allowed to enter the school. Since the school building had to be entirely renovated, the school was not opened before 1817.[57] Later the General Commissioners also agreed to establish similar elementary schools in Gresik, Surabaya, Semarang and in downtown Batavia.[58]

Reinwardt also initiated the reopening of the military school in Semarang. The central aim of the school, which had been founded by VOC merchants in 1782, was to prepare young candidates for service in the colonial army and navy. The school had also played a crucial role in the mapping of Java after the Fourth Anglo-Dutch war. Students and teachers at the school had prepared a large number of detailed hydrographical and topographical maps of Java's coastal areas.[59] Like its counterparts in the

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[55] R. van Niel, *Java's Northeast Coast, 1740-1840. A Study in colonial encroachment and dominance* (Leiden: CNWS Publications, 2005), 293.

[56] De Vriese, *Reinwardt's reis,* 249.

[57] J. van Lennep, ed., *Het leven van Mr. Cornelis van Lennep en Mr. David Jacob van Lennep,* vol. 4, *Het Leven van D.J. van Lennep* (Amsterdam: Frederik Muller, 1862), 133, letter Elout to David J. van Lennep, 4 July 1817.

[58] NA The Hague, Ministerie van Koloniën, 1814-1849, inv. 2371, decision commissarissen generaal, 16 January 1818, no. 29.

[59] G. Knaap, et al., *Grote Atlas van de Verenigde Oost-Indische Compagnie*, 2*: Java en Madoera* (Voorburg: Asia Maior/Atlas Maior, 2007), 34.

Netherlands, the school's curriculum covered a broad array of subjects.[60] Apart from more practical courses, its lecturers also offered courses in cartography, hydrography and physics, European and indigenous languages, and history.[61] After the school opened its doors in 1818, Reinwardt remained affiliated with the institute as a member of the board until his departure five years later.[62]

In order to improve the health care system in Java, Reinwardt established a municipal committee for civilian health care in Batavia. The new institution was supposed to work alongside the already existent military medical service which had been established at the end of the eighteenth century.[63] The Batavian committee was ordered to develop rules for day-to-day medical practice in Batavia and the surrounding areas, a function similar to that of medical committees in the Netherlands. Moreover, its members were asked to examine apothecaries, surgeons and medical doctors and to survey their work in colonial hospitals.[64] Reinwardt hoped that his efforts would help to change the deplorable situation he found. As he described it:

> Neither laws, nor one single authorized committee helped them to choose truly qualified medical doctors; prejudices, the coincidentally successful result of an empirical treatment, or other groundless reasons often determined their choice; unbridled quackery was unimpededly allowed to control the life of many inhabitants and more than one example of this detrimental development has not remained unknown to the [colonial] administration.[65]

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[60] For more information on the military school established in Delft in 1814, see G.P.J. Verbong, "Gescheiden paden 1813-1842," in *Geschiedenis van de Techniek in Nederland. De wording van een moderne samenleving, 1800-1890*, vol. 5, *Techniek beroep en praktijk* ed. H.W. Lintsen, et al., 53-56 (Zutphen: Walburg Pers, 1994).

[61] For the exact curriculum, see De Vriese, *Reinwardt's reis,* 262-71.

[62] De Vriese, *Reinwardt's reis,* 250-1 and UB Leiden, BPL 2425, inv. 5, entry August 1818.

[63] A.H.M. Kerkhoff, "The organization of the military and civil medical service in the nineteenth century," in *Dutch Medicine in the Malay Archipelago 1816-1942*, ed. G.M. van Heteren, et al. (Amsterdam: Radopi, 1989), 9-12.

[64] De Vriese, *Reinwardt's reis,* 251-2.

[65] Ibidem, 251: "Wetten, nog eenige daartoe bevoegd collegie was hun behulpzaam in het kiezen van waarlijk bekwame geneeskundigen; vooroordeelen, de toevallig gelukkige uitkomst eener empirische handeling, of andere even zoo ongegronde redenen, bepaalden veelal deze keuze; eene onbeteugelde kwakzalverij mogt onverhinderd over het leven van

This brief analysis of Reinwardt's involvement in the reorganization of the public health and educational system in Java has shown that the naturalist played a leading role within the Dutch new colonial administration. Following the practice of administrators in the Netherlands, Reinwardt placed all schools and medical practices in Java under central governmental control, and to ensure the quality of the services delivered he appointed special inspectors to examine and survey the daily practice of teachers and physicians throughout the entire island. The following section will show how Reinwardt's influential position facilitated another project that was meant to improve the colony's agriculture and economy.[66]

Establishing a Botanical Garden in Buitenzorg

In early 1817, Reinwardt suggested that the General Commissioners establish a botanical garden next to the palace of the Governor General in Buitenzorg. According to Reinwardt, a favourable climate and volcanic soil made Buitenzorg an ideal environment for the cultivation of economic, medicinal and exotic plants from all over the Archipelago. These could then be shipped to similar gardens in Europe and other colonies. Moreover, the nearby Ciliwung River would supply the garden with sufficient water.[67] In January 1817, Reinwardt wrote to Van Marum:

> Owing to more rain and a better climate here in Buitenzorg, the cultivation of plants works out much better then in Batavia; I have already made plans with a gardener to sow and cultivate uncommon plants in wooden boxes which can

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vele ingezetenen beschikken, en meer dan een droevig voorbeeld dezer schadelijke uitwerking is zelfs aan het Bestuur niet onbekend gebleven."

[66] For a detailed discussion of the reforms in the Netherlands, see J. Kloek and W. Mijnhardt, "The well-being of society: education," in *Dutch culture in a European perspective*, vol. 2, *1800: Blueprints for a national community*, ed. J. Kloek, et al., 243-64 (Assen: Royal van Gorcum, 2004); and J. Kloek and W. Mijnhardt, "The well-being of society: poor relief and health care," in *Dutch culture in a European perspective*, vol. 2, *1800: Blueprints for a national* community, ed. J. Kloek, et al., 265-84 (Assen: Royal van Gorcum, 2004).

[67] The request by Reinwardt and the subsequent decision taken by the General Commissioners are reprinted in M. Treub, *Geschiedenis van 's Lands Plantentuin te Buitenzorg. Eerste gedeelte* (Batavia: Landsdrukkerij, 1889), 2-4.

> be dispatched to Europe if a suitable person happens to be available to look after the plants during the journey.[68]

Three months later the colonial government offered Reinwardt a suitable piece of land and authorized him to hire James Hooper as gardener. He received a monthly salary of 150 guilders.[69] Since Hooper had been trained at Kew gardens—one of the centres for botanical research in early nineteenth-century Europe—Reinwardt was more than pleased when Hooper accepted the position. Hooper remained affiliated with the garden in Buitenzorg until 1830.[70]

Beside Hooper, Reinwardt could draw upon another plant expert: the German physician Carl Ludwig Blume, who had studied medicine in Leiden under Sebald Justinus Brugmans and who arrived in Java in late 1818.[71] Impressed by Blume's floral expertise, Reinwardt quickly affiliated him with the botanical garden and his Department for Agriculture, Arts and Sciences,[72] and even invited him to live in his house in Buitenzorg.[73] Blume's subsequent appointment as inspector for the smallpox vaccination allowed Blume to travel around and to investigate the floral world in the hinterland of Batavia.[74] During these journeys, Blume collected a large number of living and dried plants and seeds which eventually formed the basis for a series of

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[68] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Buitenzorg, 1 January 1817: "Hier op Buitenzorg, alwaar wegens de meerdere regen en het beter klimaat het kweken veel beter gaat dan te Batavia, heb ik reeds met de tuinman een plan gemaakt, om eenige merkwaardige gewassen in houten kasten te saaijen en te planten, en deze alzo, wanneer daartoe eene geschickte gelegenheid en een persoon is, die gedurende de reis deze verzorgen kan, naar Europa over te zenden."

[69] NA The Hague, Ministerie van Koloniën, 1814-1849, inv. 2367. Decision General Commissioners 15 April 1817, no. 36.

[70] Th. F. Rijnberg, *'s Land Plantentuin, Buitenzorg 1817-1992. Kebun Raya Indonesia Bogor* (Enschede: Johanna Oskamp, 1992), 23.

[71] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Batavia 12 December 1818. For a concise biography of Blume see A. den Ouden, "C.L.Blume, periode 1826-1832" (master's thesis, Leiden University, 1979), 7-8.

[72] J. MacLean, "Carl Ludwig Blume and the Netherlands Indies," *Janus. Revue Internationale de l'Hisotoire des Sciences, de la Médicine, de la pharmacie et de la technique* 66 (1979): 16-17.

[73] NA The Hague, Ministerie van Koloniën, 1814-1849, inv. 2445. Decision of the Governor-General, 1 February 1819, no. 18.

[74] For the exact collection localities of Blume, see M.J. van Steenis-Kruseman, *Malaysian plant collectors and collections being a cyclopedia of botanical exploration in Malaysia* (Jakarta: Noordhoff-Kolff N.V., 1950), 64-66.

botanical studies such as the *Tabellen en platen voor de Javaansche orchideeën* (Tables and plates of Javanese orchids, 1825), the *Bijdragen tot de Flora van Nederlandsch Indië* (Contributions to the flora of the Netherlands Indies, 1825-27), and the *Enumeratio plantarum Javae* (1827-28). These publications, which were published in Batavia and Leiden, comprised botanical descriptions of various plant families in the form of long lists and a few illustrations. They were partly written in Latin and partly in Dutch.[75]

The actual construction of the garden started in May 1817. According to an early schematic map, the garden area was divided into different sections. In addition to beds and fields for local and European (cash) crops, herbals, flowers and trees, the garden possessed storage rooms for harvested crops, agricultural tools and accommodations for the indigenous workers. According to the annual budget of the garden made by Reinwardt in 1822, the garden employed around sixty-five local helpers who received three guilders a month. In order to facilitate the reworking of the soil, buffalos and cows were held in stables close to the garden area. Apparently, the garden was joined to the Governor-General's small private zoo where pigs, an elephant, a rhino, and horses were held.[76] The administration of both institutions was separated in 1822.[77]

According to a catalogue compiled by Blume in 1823—one year after Reinwardt had returned to the Netherlands—the garden comprised more than nine hundred plant species. While the majority of the plants came from the mountainous hinterland of Batavia and the Moluccas, the garden also exchanged plants with gardens in China, Japan, Brazil, Bengal, and France. In his introduction to the catalogue, Blume noted that almost all attempts to grow foreign seeds turned out to be a success.[78] As Reinwardt had written to Van Marum in February 1818:

> We are progressing nicely with the garden. I am sure that it will have a beautiful layout, such as only a few have in Europe. From *China* I have received many nice plants.

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[75] For more information on the history of these publications, see C.G.G.J. van Steenis, "Dedications," in *Flora Malesiana*, vol. 10, ed. C.G.G.J. van Steenis, et al., 9-12, 23-5 (Batavia: Nordhoff-Kolff, 1989); and Den Ouden, *C.L.Blume,* 33-62.

[76] Rijnberg, *'s Land Plantentuin,* 136-9.

[77] M. Treub, "Korte geschiedenis van 's Lands Plantentuin," in *'s Lands Plantentuin te Buitenzorg, 18 Mei 1817-18 Mei 1892* (Batavia: Landsdrukkerij, 1892), 6-7.

[78] C.L. Blume, *Catalogus van eenige der merkwaardigste zoo in- als uit-heemsche gewassen te vinden in 's Lands Plantentuin te Buitenzorg* (Batavia: Landsdrukkerij, 1823), 4.

> From *Japan* I was sent some, but they have suffered so much during the journey that only a few will remain alive.[79]

The various links between the different colonial botanical gardens in Asia was also mirrored in the assigned plant names. Reinwardt named, for instance, one of the new plant families—the *Wallichia*—after the superintendent of the botanical garden in Calcutta, Nathaniel Wallich (1786-1854).[80]

The garden also included plants from the Netherlands. In early July 1817, for instance, Reinwardt requested that Van Marum send him seeds of flowers, trees, herbals and 'oeconomic' plants. Reinwardt explicitly asked for, among others, tulip bulbs, buckwheat, flax, birches and fruit trees.[81] Reinwardt in turn regularly sent Van Marum bundles of plant sketches, plant seeds and small boxes with living plants for his own garden, Plantlust, as well as for gardens in Amsterdam, Gent, Groningen, Utrecht and Leiden.[82]

This overview of Reinwardt's garden project sheds light on the garden's hybrid function. Buitenzorg served as a place where Reinwardt and his assistants could cultivate and acclimatize the economically rewarding crops and plants they received from various parts of the far-flung Malay Archipelago and sister institutions in the Netherlands, France, China, Japan, Brazil and India. Of particular importance were the economic gardens in the British Empire, the number of which had increased tremendously as the empire expanded in the second half of the eighteenth century. Triggered by the growing need for timber and other natural resources after the Seven

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[79] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Buitenzorg, 6 February 1818: "Met den hortus hier vorderen wij al sterk. Dit zal er zeker een zo schone aanleg worden, als er zelfs in Europa weinigen bestaan. Van *China* heb ik verscheiden fraaie planten ontvangen. Van *Japan* waren mij ook eenigen toegezonden doch deze hebben op reis zo veel geleden dat er slechts weinig van zal in het leven blijven."

[80] C.L. Blume, *Catalogus van eenige der merkwaardigste zoo in- als uit-heemsche gewassen te vinden in 's Landsplantentuin te Buitenzorg* (Batavia: Landsdrukkerij, 1823), 11. For a recent analysis of Wallich's hybrid career, see D. Arnold, "Plant capitalism and Company science: The Indian career of Nathaniel Wallich," *Modern Asian Studies* 42:5 (2008): 899-928.

[81] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Batavia 1 July 1817.

[82] See, for instance, NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Buitenzorg, 9 April 1817; ibidem, Batavia 1 July 1817; ibidem, Buitenzorg, 10 December 1817; ibidem, Bandung, 16 August 1819; ibidem, Batavia 25 February 1821.

Years´ War, British administrators had set up gardens in Calcutta, Madras, Samulcottah, and Bombay in India; in Colombo, Sri Lanka; at the Cape of Good Hope; and on the Atlantic island of St. Helena, and St. Vincent in the West Indies.[83] Under the aegis of Joseph Banks, the British garden network developed into a highway for the exchange and acclimatization of economically rewarding and exotic plants.[84] By joining these growing networks, the garden in Buitenzorg gradually emerged as a new nodal point for botanical investigations in Southeast Asia.[85]

Yet, beside the acclimatization of plants, the garden in Buitenzorg also formed an important site for Reinwardt and his helpers to discuss, order and describe the plants which they had collected during their field trips in Java. Blume even started to compile his own collection of dried plants. When Reinwardt discovered this effort to establish a private herbarium, he stepped in and impounded the collection on behalf of the colonial government. But in the end, Reinwardt's attempts to maintain a monopoly on the interpretation of Java's vegetation failed. While Reinwardt spent most of his time on 'improving' the emerging colonial state, Blume continued enriching his herbarium and even started to prepare publications on Java's flora, which led to increased tension between Reinwardt and Blume. When in 1820 Reinwardt discovered that Blume wanted to dispatch plants to the Netherlands under his own name, Reinwardt sought the assistance of the colonial government. The governor general confirmed Reinwardt's claims and confiscated Blume's herbarium and placed it under Reinwardt's

[83] For a history of the emergence and function of the British colonial botanical gardens, see R.H. Grove, *Green imperialism. Colonial expansion, tropical island Edens and the origins of environmentalism* (Cambridge: Cambridge University Press, 1995), 309-48; and Drayton, *Nature's government*, 106-24. For an intriguing analysis of the Ceylonese case, see S. Sivasundaram, "Islanded: Natural history in the British colonization of Ceylon," in *Geographies of nineteenth century science*, ed. D.N. Livingstone and Charles W.J. Withers, 123-48 (Chicago: University of Chicago Press, 2011).

[84] Fa-ti Fan reminds us that botanical gardens were not the only places where plant specimens were gathered and exchanged in the decades around 1800. In his analysis of the port city of Canton, he stresses the importance of markets and the gardens of local merchants as essential collecting points; see Fan, *British naturalists in Qing China*, 11-39. For an overview of Banks' collectors network, see D. Mackay, "Agents of empire: the Banksian collectors and evaluation of new lands," in *Visions of empire. Voyages, botany, and representations of nature,* ed. D.P. Miller, et al., 38-57 (Cambridge: Cambridge University Press, 1996).

[85] Goss, *The Floracrats,* 27-31.

supervision.[86] This policy was later codified in a set of instructions for Blume, who stayed on in Java as director of the botanical garden until 1827.[87]

Collecting as Collaborative Enterprise

Owing to his many administrative obligations, Reinwardt hardly found time to collect natural historical items himself. As the following analysis will show, collecting and preparing specimens was a collaborative endeavour that spanned the entire Malay Archipelago. Beside his own collectors who accompanied him on his travels, he could count on various individuals who sent specimens for free or offered specimens for purchase. In December 1816, Reinwardt for instance received a cage which contained a rare bird, which local people called *boerung rankong*. The sender—a colonial civil servant—explained in the attached letter that a local hunter in the mountainous hinterland of Batavia had given him the bird as a present. He further expressed his hopes that the bird would enrich Reinwardt's collection.[88] One year later, Reinwardt agreed to buy a collection of shells and horns from a European collector in Semarang for more than 3000 Indies guilders.[89] And one of the highlights of Reinwardt's first shipment to the Netherlands in September 1817 was the skeleton of a crocodile which locals had caught for him in the harbour of Batavia.[90]

Reinwardt's most important external collectors, however, were Jacob d'Arnoud van Boeckholtz and the pensioned German military August Franz Treffz (1770-1819). Boeckholtz was a special emissary whom the General Commissioners had sent to Borneo in order to secure the Dutch influence there. Since Governor-General Daendels had abandoned the Dutch post in Banjarmasin a couple of years before, the British now considered the settlement part of their empire and declined to return it to the Dutch.

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[86] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Buitenzorg, 16 April 1820.

[87] NA The Hague, collectie Reinwardt, inv. 3. Extract uit het Register der Handelingen en Resolutien van den Gouverneur Generaal in Rade, Batavia, 11 June 1822.

[88] NA The Hague, collectie Reinwardt, inv. 4, letter Doorninck to Reinwardt, Buitenzorg, 3 December 1816.

[89] Ibidem, letter Blok to Reinwardt, Semarang, 16 December 1817.

[90] Bataviasche Courant, 5 September 1818, no. 36. The article is reprinted in De Vriese, *Reinwardt's reis,* 223-24.

Tenacious negotiations and violent skirmishes that also involved local rulers were the consequence.[91]

Besides his diplomatic duties, Boeckholtz collected various natural historical items for Reinwardt. An inventory for a shipment in September 1817 lists two young living orang-utans, two prepared bear skins, six monkeys, a box with various rock, clay and coal samples, and a large number of clothes, weapons and other ethnographical items. Boeckholtz's brief catalogue includes additional information such as the provenance of each item. Regarding the orang-utans, he noted, for instance:

> [F]rom the Daijak and there called *ka-hi-oh*. They are still very young but are from the largest sort. They have been caught together with their mothers, but since they could not be overmastered and always bit through the ropes they have been bound with, one was obliged to kill them [the mothers] and be satisfied with the young ones.[92]

In an accompanying letter, Boeckholtz described the difficulties he faced in the field. His lack of expertise as a naturalist was compounded by the scarcity of reliable and experienced local helpers for tours to the mountainous hinterland of Borneo. Boeckholtz often either received the wrong type of animals or the birds, snakes, cats, and monkeys collected died before they arrived in Banjarmasin.[93]

Reinwardt's other collector, Treffz, was a former member of the so-called Kapregiment, a group of around 3200 soldiers which the duke of Wuerttemberg had leased to the VOC in 1786 in order to secure its outposts in Ceylon, the Coromandel Coast, Java, Celebes and at the Cape. Treffz reached the Netherlands Indies in 1791 and, after the Kapregiment was

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[91] Tarling, *Anglo-Dutch rivalry in the Malay world,* 86-87; and G. Irwin, *Nineteenth-Century Borneo. A Study in diplomatic rivalry* ('s Gravenhage: Martinus Nijhoff, 1955), 35-51.

[92] NA The Hague, collectie Reinwardt, inv. 4, Lijst van zoodanige artikelen des door den onder-geteekenden voor den Heere C.G.C. Reinwardt te Banjermassing zijn verzamelden ter gedeeltelijke voldoening aan zijn Hoog Geleerden deswegens gedane aanvragen, benevens eenige korte aantekeningen. Surabaija, 4 September 1817: "[U]it de Daijak en aldaar ka-hi-oh genoemd. Zijnde nog zeer jong doch van de grootste soort. Zij zijn samen met hunne moeders gevangen, doch daar deze niet te bedwingen waren en telkens weer de touwen waarmede zij gebonden waren in stukken beten, is men verpligt geweest dezelve te doden en zich eenlijk met de jongen te vergenoegen."

[93] Ibidem, letter Boeckholtz to Reinwardt, Sourabaija, 4 September 1817.

dissolved, held various positions within the Dutch colonial army. Upon the death of his wife in 1818, Treffz intended to return to Württemberg before deciding to stay in Java and work as a collector for Reinwardt on the island of Celebes.[94]

Figure 26: Field sketch of a Flying lizard, probably drawn by Gerrit L. Keultjes (1786-1821).

[94] J. Prinz, *Das württembergische Kapregiment 1786-1808. Die Tragödie einer Söldnerschar* (Stuttgart: Von Strecker und Schröder, 1932), 4-78.

In the summer of 1819, Reinwardt received five boxes with natural historical items. The boxes contained seven living monkeys (*pararang*), three snakes, one gecko, a chicken, a dried fish, two agamid lizards, and one bottle with several prepared flying lizards.[95] In the letter that accompanied the shipment, Treffz provided Reinwardt with more information about his collecting practices and the natural habits of the collected animals.[96] In September 1819, Treffz informed Reinwardt that a collection of skulls of four rebellious local chieftains, various weapons and clothes were awaiting shipment in Makassar.[97]

This brief sketch of Reinwardt's collector network reveals the complexity of collecting natural historical items in the field. By the time these items reached the cabinets in the Netherlands, they had passed through the hands of almost countless local hunters, colonial civil servants, sailors and harbour workers. Vital information on the natural habitat of living animals was often provided by local people. Even 'collectors' such as Boeckholtz were thus highly dependent on indigenous collectors and their expertise.

Shipping Specimens to the Netherlands

According to his instructions, Reinwardt regularly forwarded items to the State Cabinet at the Trippenhuis in Amsterdam. The first boxes left Batavia in September 1817 in the warship *Amsterdam*. According to an article published in the *Bataviasche Courant,* the boxes were filled with prepared animal skins, insects, birds, skeletons, and other anatomical items which had been preserved in bottles filled with alcohol. The boxes also comprised a large collection of minerals, shells and corals from the Moluccas. Some items even originated from China, Bengal and elsewhere.[98]

The specimens that Reinwardt had received from Boeckholtz formed an essential part of Reinwardt's second shipment to the Netherlands. The boxes of the second shipment were spread over two ships which left Batavia in late 1818 and in early 1819. According to an article in the *Bataviasche Courant,* the skeleton of a large tiger, a kangaroo from Australia, and samples of around 140 bird species were part of a shipment of plant seeds and around

[95] NA The Hague, collectie Reinwardt, inv. 4: Lijst der goederen bestaande in natuurlijke voorwerpen verzonden van Macasser naar Sourabija, 23 July 1819.
[96] Ibidem, letter Treffz to Reinwardt, Makassar, 23 July 1819.
[97] Ibidem, letter Treffz to Reinwardt, Makassar, 4 September 1819.
[98] Bataviasche Courant, 5 September 1818 reprinted in De Vriese, 223-4.

80 living plants which had been specially cultivated for the medical gardens of the Universities of Leiden, Utrecht and Amsterdam. Other boxes contained sketches of Javanese plants by Adrianus Johannes Bik, a large landscape painting, and ethnographical items such as weapons and clothes.[99]

In the end, none of these items reached the Netherlands. All three ships on which the material had been loaded between late 1817 and early 1819 went down close to the Cape. When Reinwardt first heard rumours about the loss of the *Amsterdam* shipment he wrote to Van Marum:

> This loss is irretrievable for the Cabinet; I say irretrievable, not because the same specimens could not be collected again, but because there is so much other work to be done which needs joy, time, and workforce, and because of the surprisingly great difficulties which the collection of the dispatched items have caused.[100]

The loss of a second shipment one year later was mentioned in an article in the *Bataviasche Courant.* The anonymous author of the brief article expressed his hope that the loss of the second shipment would not weaken the colonial government's support of Reinwardt's collecting activities.[101]

In contradiction to his instructions, and despite his actions towards Blume, Reinwardt did not exclusively ship natural historical items to the cabinet in Amsterdam. In June 1819, he offered (via Van Marum) bird skins and mammals to the Dutch Society of Sciences (Hollandsche Maatschappij van Wetenschappen) and geological specimens to Teyler´s Museum in Haarlem.[102] He also received requests from other learned societies such as the *Zeeuwsch Genootschap van Wetenschappen* (Zeeland Society of Sciences) in

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[99] Ibidem, 30 January 1819 reprinted in De Vriese, 225-7.

[100] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Batavia, 20 May 1818: "Dit verlies is voor het Kabinet onherstelbaar; ik zeg onherstelbaar, niet om dat dezelfde voorwerpen niet nog wederom zouden kunnen verkregen worden, maar omdat nog zoo veel ander werk te doen is, waartoe lust, tijd en arbeid vereischt wordt, en om de verbazende moeite die de inzameling van het gezondene veroorzaakt heeft."

[101] Bataviasche Courant, 17 April 1819, no. 16.

[102] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Banjaran, 18 June 1819.

Middelburg.[103] In a letter to Van Marum, Reinwardt was rather astonished by this request:

> The Zeeland Society has made me correspondent and asks me to dispatch items for its cabinets. It will be difficult to meet this and many other requests, which don't stop burdening me. I did not even know that this society has a collection of natural historical items. Do you know it, and does it mean anything? [104]

Although Reinwardt initially declined to dispatch specimens to other cabinets, he later asked Van Marum to forward boxes with birds and insects to the learned society in Middelburg as well as to individual collectors such as the Russian consul-general Georg Heinrich von Langsdorff (1774-1852) in Rio de Janeiro and the wealthy private insect collector Bernt Wilhelm Westermann (1781-1868) in Kopenhagen.[105]

The desperate requests for specimens from individuals and learned societies such as the one in Middelburg shows the growing public interest in natural historical and ethnographical specimens from Java. Publication of Raffles' *History of Java* in 1817 had sparked considerable interest in the Dutch colony and by July of that year, shortly after its publication in London, booksellers in The Hague offered the city's mayor a copy of the illustrated monograph to help expedite its translation into Dutch.[106] As in France and Britain, natural historical and ethnographical collections and lavishly illustrated publications on animals, plants, societies and minerals in

[103] For a brief history the cabinet of the Zeeuwsch Genootschap, see H.J. Zuidervaart, "Het kabinet der natuurlijke zeldzaamheden van het Zeeuwsch Genootschap der Wetenschappen, 1771-1869," in *Het verdwenen museum. Natuurhistorische verzamelingen, 1750-1850*, ed. B.C. Sliggers, 155-74 (Blaricum: V+K Publishing, 2002).

[104] Ibidem, letter Reinwardt to Van Marum, Buitenzorg, 10 October 1818: "Het Zeeuws Genootschap heeft mij tot correspondent gekozen, en verlangt van mij voorwerpen voor zijne kabinetten. Het zal moeilijk zijn om aan deze en zo vele andere aanvragen te voldoen, waarmede men niet ophoudt mij te belasten. Ik wist niet dat dat genootschap ook al eene verzameling van Natuurhist.[orische] voorwerpen had. Is U die bekend, en betekent die wat?"

[105] Ibidem, letter Reinwardt to Van Marum, Batavia, 3 June 1820 and Buitenzorg, 8 September 1820.

[106] Advertentie, *'s Gravenhaagsche courant*, 16 July 1817.

colonial areas gradually developed into material signifiers of colonialism at home.[107]

Conclusion

This chapter has shown that Batavia and Buitenzorg offered the General Committee and Reinwardt a crucial, if unstable, platform from which to launch various initiatives to survey and improve the island's administration and economy. Reinwardt specifically focused on the improvement of public health and the educational system, while Elout and Van der Capellen aimed at getting a general overview of the colony's current state. In order to gather the necessary information, they all tried to strengthen extant administrative and commercial networks through the appointment of new civil servants who had to report intermittently about their observations in the different administrative districts.

The growing administrative and commercial networks fed another project: the establishment and enlargement of a botanical garden in Buitenzorg. Under Reinwardt's direction, the garden quickly developed into a nodal point for the collection and acclimatization of useful and exotic plants from Europe, various parts of the Malay Archipelago, China, Japan, India, and even Brazil. Gathering these plants was a collaborative endeavour. The discussion of Reinwardt's networks of collectors in Borneo and Celebes has shown how heavily they depended on local skills and expertise. Without the practical experience of numerous indigenous helpers, none of these items would have reached the botanical garden in Buitenzorg, much less the Netherlands.

Many of the collected plants, animals and minerals were eventually forwarded to the State Cabinet in Amsterdam. In particular the king hoped that newly collected items would help to transform the small cabinet into a new national natural historical institution with the potential to illustrate the kingdom's grandeur and 'scientific' prestige. However, since Reinwardt's first shipments did not reach the Netherlands, the king and his advisors gradually

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[107] For two of the very rare attempts to analyze the material and visual culture of Dutch expansionism in the early nineteenth century, see S. Legêne, *De bagage van Blomhoff en Van Breugel: Japan, Java, Tripoli en Suriname in de negentiende-eeuwse Nederlandse cultuur van het imperialisme* (Amsterdam: Koninklijk Instituut voor de Tropen, 1998); and S. Protschky. *Images of the tropics. Environment and visual culture in colonial Indonesia* (Leiden: KITLV Press, 2011).

doubted Reinwardt's authority as collector and 'scientific' traveller. His reputation also suffered by comparison with his younger assistant Carl Ludwig Blume. While Reinwardt spent most of his time on administrative issues, Blume was able to focus his attention on Java's flora. Beside collecting plants for the botanical garden and his private herbarium, Blume started to prepare the publication of specialized articles and monographs on Java's flora with the aim of demonstrating his status as an 'expert' on Java's nature. Owing to the rising doubts about Reinwardt's abilities, it is therefore not surprising that Reinwardt's friends in the Netherlands urged him to shift his focus from his administrative duties in Batavia towards the collection of natural historical specimens in less investigated parts of the island such as the Preanger in the hinterland of Batavia.

The following chapter will show that Reinwardt was not the only one who became aware of the importance of observations in the field. Within a few months of their arrival in Java, Van der Capellen and Elout had realized that gaining reliable information of the economic and political situation of more remote provinces in Java was a difficult endeavour. Although many administrators in remote provinces had fulfilled the General Committee's request to hand in reports about their districts, the assembled information remained too fragmentary to develop a more general vision on the basis of which the colony's administration could be improved. Even the recommendations of Batavia's administrative elite had to be treated with caution. Many of them seemed to promote their own agendas with the broader aim of securing their social status and their financial well-being. Advisors such as Herman Warner Muntinghe (1773-1827) and Nicolaus Engelhard (1761-1831) were not only experienced administrators, but owners of large plantations where coffee and other cash crops were cultivated. The official documents in the archives at Batavia offered no solution.[108] Since the British administrators had left the records in a chaotic state, the General Committee had to apply another proven and tested administrative tool to gather reliable data about the island's administration and economy: travelling!

[108] This point is further explored by Jeurgens, "Op zoek naar betrouwbare informatie," 271-75.

5

Forging a New Identity

*During his travels which he [Reinwardt] is expected to carry out on Java and the neighbouring islands with clearly prescribed aims, he is obliged to focus his attention on the customs, language and mentality (*denkwijze*) of the inhabitants, their religion and their forms of government in order to be able to deliver us after his return a well-reasoned report on the real condition of the possessions visited by him.*

Article 5 of Reinwardt's instructions
issued by Willem I on 11 January 1815.[1]

From July 1817 onwards, Reinwardt and his draughtsman Jannes Theodorus Bik accompanied the General Commissioners Elout and Van der Capellen on a tour of inspection along Java's north coast and to the courts in Surakarta and Yogyakarta in the interior of the island. The tour took four months. Like their Batavian colleagues Goldberg and Kops, Van der Capellen and Elout considered the tour an opportunity to verify and supplement the information they had received beforehand. Before the expedition departed in July 1817, all district heads were informed of the

[1] UB Leiden 2425, 3, Royal decision 11 January 1815, article 5: "Op reizen welke hij met voorschreven oogmerk hetzij in de binnenlanden van Java, hetzij op de omliggende eilanden doen zal, behoort hij bijzonder zijne aandacht te vestigen op de zeden, taal en denkwijze der inwoonderen, hunne godsdienst en hunnen regeringsvorm, en zich, zoo doende, in staat te stellen, ons, bij zijn retour, een beredeneerd verslag van de eigenlijke gesteldheid der door hem bezochte bezittingen aan te bieden."

upcoming visit of the commissioners. In order to facilitate the tour, all district officers (*residents*) had to provide suitable accommodation and enough post horses to carry urgent administrative letters between the travelling administrators and the colonial bureaucracy back in Batavia.[2] During their stay in the capitals of the various districts, the General Commissioners gathered with the European and indigenous heads of the provincial administration. Usually they used these meetings to discuss the reports that European and indigenous district officers (*residents* and *regents*) had submitted beforehand. Moreover, they tried to gather new data on the current political and economic state of the respective provinces.

Reinwardt played a crucial role during this journey. As advisor to the General Committee, Elout and Van der Capellen constantly requested that he observe, judge and evaluate pressing administrative issues they encountered in the field. Travelling with the General Committee was thus an exhausting endeavour. In particular the requirement to summarize all observations in the form of a 'report'—a central feature of the General Committee's governance—seemed to have exceeded Reinwardt's capacity for hard work by far. In various letters to friends in the Netherlands, he complained about the heavy workload. To De Vries in Amsterdam he wrote: "My duties themselves are already too big and diverse; burdened with such a broad array of tasks one man is not enough to fulfil all of them."[3]

Reinwardt's almost exclusive focus on governmental issues created tensions with his friends in the Netherlands. Apparently many of them had expected that Reinwardt would spend most of his time on collecting natural historical specimens in order to satisfy the growing public interest in colonial nature and society at home. Van Marum, De Vries and Van Lennep sent angry letters to Elout in which they demanded that Reinwardt be released from administrative tasks and given more time for his natural historical investigations. Although Elout's first reaction was rather reserved, the interventions from the Netherlands bore fruits.[4] In April 1818, Elout reported to Van Lennep that the colonial government had given Reinwardt a spacious house close to the botanical garden in Buitenzorg where he could

[2] P.H. van der Kemp, *Het Nederlandsch-Indisch bestuur in het midden van 1817* ('s-Gravenhage: Martinus Nijhoff, 1915), 322-23.

[3] KB The Hague, 121 B 8, letter Reinwardt to De Vries, Batavia, 24 December 1817: "Mijne bezigheden zijn zelfs al te groot en onderscheiden; door het hebbenden van zoo vele taken kan men in singularis niet voldoen."

[4] Van Lennep, *Het Leven van D.J. van Lennep*, 155-61, letter Elout to David Jacob van Lennep, Batavia, 29 March 1818.

live for the rest of his stay in the colony. He even promised to provide financial means for longer natural historical expeditions to the hinterland of Batavia and the Eastern part of the Malay Archipelago.[5] Reinwardt was consequently exempted from participating in a second and third tour of inspection through Java which took place in 1819 and 1821/22 respectively.[6]

By following Reinwardt into 'the field', this chapter sheds light on the genesis and construction of his identity as colonial administrator *and* scientific traveller. After his return to the Netherlands in 1823, Reinwardt used this hybrid identity as a vehicle to secure and enhance his status and authority as an investigator and 'improver' of the Dutch colony in the East. While individuals such as his assistant Blume and the American naturalist and collector Horsfield focused on the mere description, classification and naming of specific plant and animals families, Reinwardt decided to fashion himself as a lonely and 'heroic' traveller *and* 'virtuous' administrator who had risked his life in the colony for the public good. Even unfavourable conditions at the top of volcanoes, as he put it in a speech at the Batavian Society of Arts and Sciences (Bataviaasch Genootschap van Kunsten en Wetenschappen) given in early 1821, could not deter him from gathering qualitative and quantitative data *in situ.*

An analysis of his two journeys on Java will show that investigating, surveying and governing Java in 'the field' was a far more complex enterprise than Reinwardt tends to admit in his writings. In particular, in the hilly hinterland of Batavia travellers such as Reinwardt depended heavily on the colonial infrastructure, as well as on the knowledge, skills and cooperation of landowners, plant experts, colonial civil servants, owners of workshops, guides, hunters and porters. Though he often remained publicly silent about this, many of them supplied Reinwardt with essential data on Java's geography, administration and nature and helped him to move through a complex physical and social landscape. In many cases, Reinwardt simply had to believe what he heard or saw, although to give greater authority to his claims, he often buttressed his observation with the claimed accuracy of data he drew from the barometers, thermometers, eudiometers, aerometers and other measuring devices he had brought from the Netherlands. Some of his reports—on the silver content of the new currency in the colony and the improvement of saltpetre production in Gresik, for instance—were based on the extensive use of these devices on site. As the last part of the chapter will

[5] Ibidem, 162-3, letter Elout to David Jacob van Lennep, Buitenzorg, 24 April 1818.
[6] Stevens, *Van der Capellen's koloniale ambitie,* 91.

show, the actual employment of these devices 'in the field' helped Reinwardt to stabilize his identity as a 'virtuous' administrator who was able to manage and govern the colonial public body in the most efficient way.

Gathering Statistical Information

The General Committee and Reinwardt departed from Buitenzorg in early July 1817. In the months to come, the caravan travelled along Java's northern coast and visited among others the places Tjiandjur, Bandung, Sumedang, Cheribon, Semarang, Surakarta, Yogyakarta, Rembang, Gresik, Surabaya, and Probolinggo. Their journey was rounded off with a detour to the island Madura. Since the establishment of a military road (Grote Postweg) which stretched from Anjer in West-Java to Panarukan in East-Java, travelling along the island's northern coast was a relatively easy endeavour. Only in the hilly Preanger region close to Buitenzorg local helpers regularly faced severe difficulties to push the heavy loaded coaches of high-ranking European notables to Tjiandjur.[7] In order to facilitate their journey to the eastern part of Java, the General Committee was accompanied by 300 local porters.[8]

Since the reign of Daendels, Java was divided into a number of administrative districts, the so-called *residenties* (districts). Every *residentie* was administrated by a European civil servant (*resident*) and one indigenous civil servant (*regent*). In order to guarantee their loyalty, both received a salary from the colonial government in Batavia. The Javanese courts in Surakarta and Yogyakarta had continued to maintain a semi-independent status.[9]

One of the aims of the tour of inspection was the gathering of information. A brief summary of the visit to Sumedang, one of the major places in the Preanger region in the hinterland of Batavia, in July 1817, sheds more light on how the encounters in the field were usually organized. In Sumedang the General Committee was first welcomed by a high indigenous notable, the so-called *adipatih*. After the *adipatih* and several *regents* from

[7] P.J.M. Nas and Pratiwo, "Java and the Grote Postweg, La Grande Route, the Great Mail Road, Jalan Raya Pos" *Bijdragen tot de Taal- Land- en Volkenkunde* 158:4 (2002): 711-12, and more general Th. Stevens, "De Postweg van Daendels: een vraagstuk," in *Herman Willem Daendels*, ed. F. van Anroy et al. (Utrecht: Uitgeverij Matrijs, 1991), 71-76.
[8] UB Leiden, BPL, 2425, 5, Reis naar Indië en Java.
[9] On Daendels' reforms, see Van den Doel, *De stille macht,* 35-41.

neighbouring provinces had assured their loyalty by swearing an oath to the new colonial government, Elout, Van der Capellen and Reinwardt talked with each *regent* individually in order to gain more information about the current social, political and economic state of their districts. The respective entries in Reinwardt's travel diary give a good impression of the scope and content of these interviews. Reinwardt noted information on the number of families living in the different sub-districts and the production of crops such as coffee, rice, and coconut trees.[10]

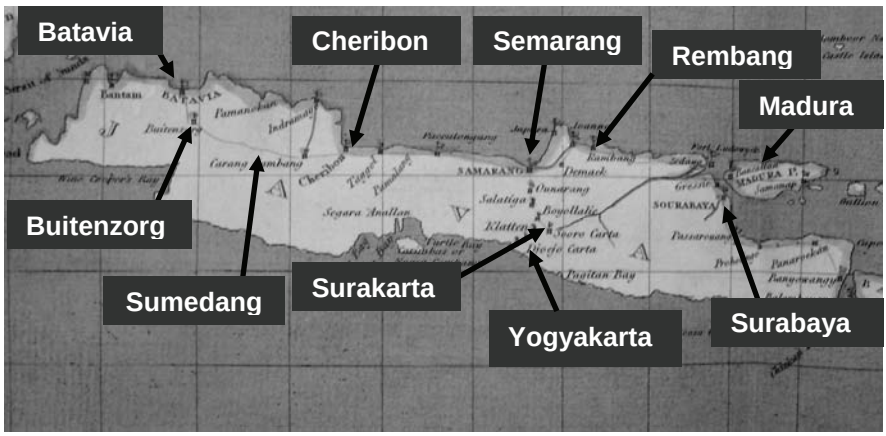

Figure 27: Map of Java with places the General Committee and Reinwardt visited.

Such gatherings also often resulted in concrete decisions and orders. In Sumedang, the General Commissioners, for instance, decreed that there should be no tax levied on the vaccination against the highly contagious skin disease of smallpox.[11] Moreover, Reinwardt was ordered to accumulate more information about this disease and the current state of the vaccination program which the British Lieutenant General Sir Thomas Stamford Raffles had introduced during his tenure. Beside the official meetings, the General Commissioners enjoyed excursions to surrounding areas. On these trips, which were either organized by the indigenous *regents* or local Dutch administrators, they went fishing or hunting or attended tiger fights.[12]

[10] UB Leiden, UBL, 2425, 5, Reis naar Indië en Java, entry: 27 July 1817.
[11] P. Boomgaard, "Smallpox, vaccination, and the Pax Neerlandica, Indonesia, 1550-1930," *Bijdragen tot de Taal-, Land- en Volkenkunde* 159:4 (2003): 591.
[12] UB Leiden, BPL, 2425, 5, Reis naar Indië en Java, entry: 24/25 July 1817.

Dealing with the Land-rent System

In Cheribon and Tegal, Van der Capellen, Elout and Reinwardt dealt with the land-rent system, another product of the British interregnum. While prior to 1800 the VOC had contracted with the local rulers to deliver fixed amounts of coffee, indigo and other cash at a set price, the British introduced a more progressive taxation system, based on the one employed in Bengal. Instead of negotiating prices and contingents with the *regenten*, Raffles allocated small parcels of land to the so-called village heads (*desa hoofden*). He hoped that the village heads would follow their self-interest by producing crops that could be sold profitably on the world market. As a compensation for the land ownership and the expected profit, Raffles demanded a land-rent payable either in money or in cash crops. The actual amount of the land rent depended on local factors such as the quality of the soil, local prices and the actual amount of the harvest.[13]

The British administrators were well aware that the land-rent system would never function unless enough statistical information about soil quality, cash crops, population, land rights, in the villages was available.[14] In order to gather such data, they had set up the so-called Mackenzie Land Tenure Commission. Under the supervision of the former surveyor of British India Lieutenant-Colonel Colin Mackenzie (1754-1821), the committee compiled information about the quality of soils and the ownership of land.[15] Moreover they ordered individual tax collectors to compile detailed maps of their respective districts including political borders, villages, roads, forests, and an exact description of all agricultural areas.[16] Much of the material served also as the basis for lavishly produced monographs such as Raffles' *History of Java* (1817), Crawford's multi-volume *History of the Indian Archipelago, containing an account of the manners, arts, languages, religions, institutions, and commerce of its inhabitants* (1820) or Horsfield's *Zoological researches in Java, and the neighbouring islands*, which came off the press in London in 1824.

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[13] For a detailed description of Raffles' land rent system, see J.S. Bastin, *Raffles' ideas on the land rent system on Java and the Mackenzie land tenure commission* ('s-Gravenhage: Martinus Nijhoff, 1954) and more recent W.R. ter Bruggen Hugenholtz, "Landrentebelasting op Java 1812-1920" (PhD thesis, Leiden University, 2008).

[14] Ter Bruggen Hugenholtz, "Landrentebelasting op Java," 26.

[15] Bastin, *Raffles' Ideas on the land rent system,* 18-33.

[16] Ter Bruggen Hugenholtz, "Landrentebelasting op Java," 23.

On top of the projects already mentioned, Mackenzie and his colleagues had distributed questionnaires among the village heads in order to gather information on the available land, products, population, property rights, and work force. Since only parts of that material had been published in Raffles' *Substance of a Minute on the introduction of an improved system of internal management and the establishment of a land rental on the island of Java* (1814), the General Committee could often only guess how the system functioned in the various districts. In October 1817, Van der Capellen summarized his observations in a letter to the king's secretary Falck as follows:

> So many districts [*residentien*], so many applications, and some completely against the spirit of the regulations, although they had been the same everywhere. Every British district officer introduced the system according to his own ideas, and our [colonial civil servant] mostly continued the way they had found it. . . . We are still busy collecting material and probably we will have to decide to appoint a suitable and experienced civil servant who . . . takes care that the law will be introduced everyway in the same way and informs the government of all anomalies.[17]

In the field, the General Committee often depended on the goodwill and advice of local civil servants. In Cheribon, for instance, the local district officer provided a detailed table containing data on the number of renters, the total and average amount of rent, and information on people who did not rent land such as children and teenagers.[18] From November 1817 on, the General Committee could also draw upon Raffles' *History of Java*, in which the former British administrator of Java summarized the accumulated statistical and other data about the island's economy, culture, geography and

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[17] Colenbrander, *Gedenkschriften van Anton Reinhardt Falck*, 469, letter Van der Capellen to Falck, Sourabaya, 14 October 1817: "Zoo vele residentien, zoo vele verschillende applicatien, en sommige geheel tegen den geest der regulatien, hoewel deze overal dezelfde geweest zijn. Elk Engelsch Resident heeft zijn ideeën bij de invoering opgevolgd, en de onzen zijn meestal voortgegaan zooals zij het gevonden hebben. . . . Wij zijn nog bezig om alle de materialen daartoe bijeen te brengen, en waarschijnlijk zullen wij er toe moeten komen om een geschikt en ervaren ambtenaar te benoemen, die . . . zorgt dat de wet overal eenparig worde uitgevoerd en het gouvernement steeds van alle afwijkingen worde onderrigt."

[18] UB Leiden, BPL 2425, 5, Reis naar Indië en Java, entry 31 July 1817.

nature in the form of a large narrative written for a wide European audience.[19]

Owing to the perpetual lack of statistical material, the General Committee eventually decided to install two special inspectors, P.H. van Lawick van Pabst (1780-?) and Hendrik Jan van de Graaff (1782-1827), who received orders to survey the land-rent system. While Van Pabst belonged to the group of 'oudgasten' who had held various high posts in the colonial administration, Van de Graaff was a newcomer to Java. Both inspectors had to submit written reports on a monthly basis. In order to facilitate their work, they were also asked to discuss their findings with the soil expert Reinwardt.[20] Until the introduction of the cultivation system in 1830, Van Lawick van Pabst's and Van De Graaff's reports formed the basis for numerous decisions regarding the administrations of the land-rent system in Java.[21]

Visiting the Principality Surakarta

After a brief visit to Pakalongan and Semarang, where Reinwardt inspected an indigo factory and a textile workshop, [22] the caravan headed for the principalities of Surakarta and Yogyakarta in the interior Java. Although the two Javanese courts had maintained a semi-independent status, the relationship with the colonial administrators in Batavia had not remained free of tensions. In particular the aggressive policies of Herman Willem Daendels and Raffles had incited unrest among the Javanese aristocracy at the courts in Solo and Yogyakarta. Instead of approaching the Javanese aristocracy in the hinterland carefully, Daendels and Raffles had forcibly subordinated the rulers in the principalities to the colonial government in Batavia. In June 1812, Raffles had attacked and plundered the sultan's palace in Yogyakarta and he banished the ruling sultan Hamengkubuwono II to

[19] P.H. van der Kemp, *Het Nederlandsche Bestuur in 1817, tot het vertrek der Engelschen naar oorspronkelijke stukken* ('s-Gravenhage: Martinus Nijhoff, 1913), 388, letter Elout to Goldberg, Semarang, 11 November 1817.

[20] Staatsblad van Nederlandsch Indië voor 1817, no. 62, besluit van Commissarissen Generaal, 5 December 1817, no. 52, art. 4 and 23.

[21] Van Niel, *Java's Northeast Coast,* 308.

[22] UB Leiden, BPL 2425, 5, Reis naar Indië en Java, entries 5 and 13-15 August 1817.

Padang on Sumatra. Moreover, he annexed parts of the sultan's territory and allocated the land to a Javanese prince who collaborated with the British.[23]

Despite the political tensions, the General Commissioners and Reinwardt were courteously received in Surakarta, where the *susuhunan* (ruler), his family and a large number of troops on horses accompanied the Dutch administrators from peripheral areas of Surakarta to the *kraton* (royal palace).[24] Van der Capellen, Elout and Reinwardt stayed in Solo for three days. Beside various festivities such as a public fight between a tiger and bull, the Dutch officials held gatherings with the *susuhunan* and other court officials where political and statistical information was exchanged. The gatherings took place in the house of the Dutch district officer as well as in the *kraton*.[25]

During their stay in Solo, Reinwardt was accommodated in the house of the American naturalist Thomas Horsfield, who was preparing the shipping of the last part of his huge natural historical collection to the museum of the East India Company in London. His enormous collection—Reinwardt was full of admiration—consisted of a large number of prepared plants, minerals, mineralogical maps, fire weapons, antiquities, drawings and sketches.[26]

Like Reinwardt, Horsfield had been trained in chemistry, pharmacy and natural history at Moravian schools at Bethlehem and Nazareth in the state of Pennsylvania and at the University of Pennsylvania. He had reached Java in 1801 and first worked as a surgeon in the Dutch colonial army, to receive permission to travel in Java.[27] Henceforth, Horsfield investigated not only large parts of west- and central Java, but also the island of Banka. He had also carried out chemical analyses of volcanic ash, minerals and water samples which he took from various volcanoes in the hinterland of Java. For Raffles, who wrestled with the introduction of the land-rent system, Horsfield's geological investigations were invaluable, and he encouraged

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[23] W. van den Doel, *Het rijk van Insulinde. Opkomst en ondergang van een Nederlandse kolonie* (Amsterdam: Prometheus, 1996), 14-21.

[24] UB Leiden, BPL 2425, 5, Reis naar Indië en Java, entry: 20-23 August 1817.

[25] Ibidem.

[26] Ibidem.

[27] For Horsfield's biography and field investigations in Java, see J. Bastin and D.T. Moore, "The geological research of Dr Thomas Horsfield in Indonesia 1801-1819," *Bulletin of the British Museum (Natural History), historical series* 10:3 (1982): 75-115; and Bastin, *The natural history researches of Dr Thomas Horsfield (1773-1859)*.

Horsfield to publish his findings. His articles appeared in the *Proceedings* of the Batavian Society of Arts and Sciences between 1814 and 1816.[28]

Figure 28: Bird illustration in Horsfield's monograph *Zoological researches* (1824).

In order to visualize his geological findings, Horsfield also compiled a mineralogical map of Banka and Java.[29] The latter map was published in

[28] T. Horsfield, "Scheikundige ontleding van een vulkaanasch zand en een ijzer-erts," *Verhandelingen van het Bataviasche Genootschap van Kunsten en Wetenschappen* 7:3 (1814): 1-8; idem, "Over de rivier van Solo in een brief aan de dirigerende leden van het Bataviasche Genootschap," *Verhandelingen van het Bataviasche Genootschap van Kunsten en Wetenschappen* 7:4 (1814): 1-16; idem, "Reis naar de ooster-streken van Java," *Verhandelingen van het Bataviasche Genootschap van Kunsten en Wetenschappen* 7:4 (1814): 17-31; idem, "Berigt, van eene met vaste-lucht bezwangerde bronwel, in het regentschap Parakan-Moentjan," *Verhandelingen van het Bataviasche Genootschap van Kunsten en Wetenschappen* 7:8 (1814): 1-12; idem, "On the mineralogy of Java. Essay I. Account of the island from its western extremity to the mountain of Sumbing, situated near the longitude of Semarang," *Verhandelingen van het Bataviasche Genootschap van Kunsten en Wetenschappen* 8:4 (1816): 1-47; idem, "Essay on the geography, mineralogy and botany of the western portion of the territory of the native princes of Java," *Verhandelingen van het Bataviasche Genootschap van Kunsten en Wetenschappen* 8:6 (1816): 1-183.

Raffles' *History of Java* (1817). Although the geological information was only superficial, it remained a crucial starting point for inquiries into Java's geology for several decades. The German traveller Franz Wilhelm Junghuhn (1809-1864), who in the 1850s published a multi-volume work on the geology and volcanology of Java, praised Horsfield's geological map for its accuracy.[30]

Reinwardt was interested in Horsfield's investigations, because his geological and mineralogical inquiries were essential for the further improvement of the land-rent system. His meeting with Horsfield gave Reinwardt an important insight into the naturalist's plans to publish his results for a European audience. Owing to the large number of items, Reinwardt estimated that it would take Horsfield several years to finish his *Natural History of Java*, which Raffles had announced in the last volume of his *History of Java*.[31] In a letter to Van Marum he rather optimistically concluded:

> You recognize that Raffles and Horsfield have done a lot of work, but you don't have to fear that there is nothing left for me. At the end of the book [Raffles' *History of Java*] a *Natural History of Java* by Horsfield is announced; but from what I have told you of this man and his investigations in my letter from Japara you can easily conclude that the public has yet to wait for that work for several years.[32]

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[29] In the second half of the eighteenth century, various mineralogical maps were produced with the intent of mapping the natural resources (ores, limestone, coal) of France, Britain, and the German states. For more details, see D.R. Oldroyd, *Thinking about the earth. A history of ideas in geology* (London: Athlone, 1996), 71-85.

[30] F.W. Junghuhn, *Java, deszelfs gedaante, bekleeding en inwendige structuur,* vol. 1 (Amsterdam: P.N. van Kampen, 1851), 98-99. For a recent biography of Junghuhn see also R. Sternagel, *Der Humboldt von Java. Leben und Werk des Naturforschers Franz Wilhelm Junghuhn, 1809-1864.* (Halle (Saale): Mitteldeutscher Verlag, 2011).

[31] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Semarang 14 November 1817.

[32] Ibidem: "Gij zult daaruit zien dat door Raffles en Horsfield veel gedaan is, doch Gij behoeft niet te vrezen dat voor mij niet nog genoeg is overgelaten. Op het eind van dat werk wordt ook eene Naturl. Historie van Java door Horsfield aangekondigd; doch uit hetgeen ik U van dien man en zijn werkzaamheden in mijnen brief van Japara geschreven heb, kunt Gij ligt opmaken, dat het publiek nog wel wat jaren op dat werk zal moeten wachten."

Reinwardt's judgment was partly right. After the publication of the illustrated monograph on Java's zoology in 1824, it took Horsfield many more years to transform his notes and field sketches into a similar monograph on Java's plants. When the first sheets of his *Plantae javanicae rariores* came off the press in 1838, Reinwardt's assistant Blume had already placed his sumptuous *Flora Javae* on the European market.[33]

After their visit to the court in Surakarta, the General Commissioners and Reinwardt moved on to neighbouring Yogyakarta, where they were welcomed by the young sultan Hamengkubuwono IV and the Dutch district officer (*resident*) Huibert Gerard Nahuijs van Burgst (1782-1858).[34] The visitors spent six days in the principality. On the first day, Reinwardt visited a limestone area near Yogyakarta where he inspected several lime kilns and investigated and analyzed the geological structure of the soil. On the next day, Reinwardt and the General Commissioners attended a fight between tigers and buffalos which the Javanese sultan had organized for them and visited the country house of the Dutch district officer a few kilometres from Yogyakarta. During his stay in Yogyakarta, Reinwardt continuously assembled data on the political and economical situation in the principality and he recorded, among other things, information on the income of the sultan, the levying of import and export duties, the most important export crops, and the current status of the rice fields.[35]

Improving Java's Northeast Coast

After a brief visit to Yogyakarta, Magelang and Japara, the General Commissioners and Reinwardt reached the city of Rembang on Java's northeast coast. Rembang was home to a large shipyard and a staple depot for teak wood from the nearby forests. The timber of Rembang was vital for Java's infrastructure, for it was used for repairing ships and constructing houses and bridges across the whole island.[36] The British had exported large

[33] The full title of Horsfield's and Blume's botanical studies are: C.L. Blume and J.B. Fischer, *Flora Javae nec non insularum adjacentium* (Brussels: J. Frank, 1828-1851); and T. Horsfield, J. Bennett and R. Brown, *Plantae Javanicae rariores, descriptæ iconibusque illustratæ, quas in insula Java, annis 1802-1818* (London : G.H. Allen, 1838-52).

[34] UB Leiden, BPL 2425, 5, Reis naar Indië en Java, entry: 24 August 1817.

[35] Ibidem, entry: 28-29 August 1817.

[36] For a more general account of the administration and exploitation of Java's forests, see P. Boomgaard, "Droefenis en duurzaamheid. Beheer en exploitatie van de bossen op Java onder Daendels (1808-1810)," *Jaarboek voor ecologische geschiedenis 2009: Natuur en*

quantities of teak wood to Bengal and the Cape, but the General Committee now forbade the export of trees and strengthened the authority of local civil servants who were responsible for the cutting and distribution of wood in Java.[37] One of their local informants was F.C.P. von Winckelmann, a former soldier. Von Winckelmann had acquired significant expertise about the economic usage of the enormous forests of Java's northeast coast and Reinwardt, who was accommodated in Winckelmann's house, was more than a little impressed by his host's knowledge about forestry in the region.[38]

A couple of days later, the General Commissioners and Reinwardt moved on to the coastal city of Gresik. Reinwardt's main task there was the inspection of the saltpetre factory at nearby Sutji. The limestone caves in Sutji offered a fertile natural environment for the production of saltpetre, one of the core ingredients in gunpowder. During his inspection, Reinwardt examined the instruments and ingredients which the workers used for the production of saltpetre. Since they applied neither an aerometer—an instrument which was necessary to judge saltpetre starch—nor used potash that met the needed requirements, Reinwardt wrote an extensive report on how the production of saltpetre in Sutji could be improved.[39] In this report he advised Elout and Van der Capellen to import accurate aerometers made of glass from the Netherlands, unless the colony's engineers in Surabaya could come up with better calibrated instruments than they had so far.[40] Moreover, he also recommended the establishment of a separate potash manufactory in a nearby forest, because the stumps of cut trees would provide excellent raw material for the production of pure potash.[41]

In early October 1817, the General Commissioners and Reinwardt reached Surabaya where they stayed for more than two weeks. While Elout and Van der Capellen focused their attention on issues such as the reorganization of the postal service, the cultivation of coffee and the local taxation system, Reinwardt was asked to survey and improve the production

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milieu in Belgische en Nederlandse koloniën, ed. M. 't Hart et al. (Gent: Academia Press, 2010), 53-77; and P. Boomgaard, *Changing economy in Indonesia. Volume 16: Forests and forestry 1823-1941* (Amsterdam: KIT, 1996), 9-38.

[37] Staatsblad van Nederlandsch Indië, no. 48, decision 8 October 1817, 136-37.

[38] UB Leiden, BPL 2425, 5, Reis naar Indië en Java, entry: 15 September 1817.

[39] The report is reprinted in De Vriese, *Reinwardt's reis*, 181-198.

[40] De Vriese, *Reinwardt's reis*, 189.

[41] Ibidem, 192-3.

of silver coins in the local minting facility.[42] Since the formation of a stable and uniform monetary system was a prerequisite for trade, administration and taxation, the General Commissioners had spent considerable time on this issue since their arrival on Java.[43] In order to survey and check the production of the new silver money, the so-called Indies guilder (*Indische gulden*), in Surabaya, the General Commissioners and Reinwardt had observed the actual minting of coins in late 1817.[44] Reinwardt subsequently provided Elout and Van der Capellen with a detailed analysis of the minted money.[45] Since the coins produced did not contain the prescribed amount of silver, the Commissioners General eventually decided to stop the production of the Indies guilder in Surabaya. In contradiction to their orders from the Netherlands, they instead instructed the head of the factory in Surabaya to continue with the production of the copper coins, the so-called *duiten*. The General Commissioners also advised the authorities in the Netherlands to produce more copper coins and ship them to Java. In order to provide the local economy with a sufficient amount of money, the colonial government also stipulated the issuing of new paper money from 1820 onwards.[46]

The General Commissioners and Reinwardt returned to Batavia at end of November 1817. In the months that followed Elout and Van der Capellen spent their time evaluating the outcome of their journey. The experiences, conversations, reports observations and statistical data which they had acquired in the course of the journey resulted in a large number of decisions and regulations. In particular the new *Regeringsreglement* issued at the end of 1818 constituted an important framework for the colony's administration in the decades to come.[47] In 1820, Van der Capellen initiated

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[42] Van der Kemp, *Het Nederlandsch-Indisch bestuur in 1817,* 385-87, letter Elout to Goldberg, Sourabaya, 10 Oktober 1817.

[43] Van Niel, *Java's Northeast Coast, 1740-1840*, 291-92. For a more general analysis of the monetary system on Java after 1816, see J.T.M. van Laanen, *Changing economy in Indonesia*, vol. 6, *Money and banking 1816-1942* (The Hague: Martinus Nijhoff, 1980).

[44] Van der Kemp, *Het Nederlandsch-Indisch bestuur in 1817,* 387-9, letter Elout to Goldberg, Sourabaya, 11 November 1817.

[45] NA The Hague, Ministerie van Koloniën, 1850-1900, inv. 368, 8: Muntwezen: Reinwardt to Raad van Finantiën, Sourabya, 5 October 1817.

[46] J.L. van Zanden, "Linking two debates: money supply, wage labour, and economic development in Java in the nineteenth century," in *Wages and currency. Global comparisons from antiquity to the twentieth century,* ed. Jan Lucassen, et al. (Bern: Peter Lang, 2007), 178; and De Prins, *Voor keizer en koning,* 129. For an older but still valuable analysis, see Zappey, *De economische en politieke werkzaamheid*, 110-15.

[47] Efthymiou, *De organisatie van regelgeving voor Nederlands Oost-Indië,* 157.

a large statistical survey of Java and neighbouring islands. Though the outcome of the survey was never published, it gave an important impetus for similar endeavours carried out in the late 1820s and 1830s.[48]

Despite the high workload demanded by the compilation of the many reports before and during the journey, Reinwardt was rather satisfied about his work. In May 1818, he informed Falck that his administrative duties had been reduced and that he was preparing a journey to the Preanger region in the hinterland of Batavia on a journey dedicated exclusively to the investigation of Java's nature and geography and the collection of plants, animals and minerals.[49]

Investigating the Hinterland of Batavia

Reinwardt's preparations for the expedition were cut short because the General Commissioners continued to ask him to write reports on various issues such as, for instance, the copper plating of ships.[50] In June 1818, Reinwardt even received orders to go to Semarang to open the military school there. This journey to the eastern part of Java lasted one month. In a letter to De Vries, Reinwardt bluntly complained about the fact that he again had to postpone his expedition: "If I had not been obliged to go to Semarang, I would have already been on my physical journey; now I am again busy with preparations for it."[51]

Preparations for the colonial government-sponsored expedition to the mountainous hinterland of Batavia, the so-called Preanger region, were not finished before March 1819. Although Dutch and British merchants had penetrated the region since the end of the eighteenth century in their efforts to establish the cultivation of coffee on a large scale, large parts of the Preanger remained a *terra incognita* to Java's colonial authorities in Buitenzorg and Batavia.[52] The land-rent system had never been introduced in

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[48] Stevens, *Van der Capellen's koloniale ambitie,* 89.

[49] H.T. Colenbrander, *Gedenkstukken der Algemene geschiedenis van Nederland 1795-1840*, vol. 8, II, 192-93, letter Reinwardt to Falck, Batavia, 20 May 1818.

[50] NA The Hague, Ministerie van Koloniën, 1814-1849, inv. 2418, letter Reinwardt to governor general, 6 June 1818.

[51] KB The Hague, 121 B8, letter Reinwardt to De Vries, 29 August 1818: "Had ik niet naar Samarang moeten gaan, ik was reeds op mijne physische reis; nu houd ik me verder met voorbereidingen tot dezelve bezig."

[52] J. Breman, *Koloniaal profijt van onvrije arbeid. Het Preanger stelsel van gedwongen koffieteelt op Java, 1720-1870* (Amsterdam: Amsterdam University Press, 2010), 21-148.

the Preanger region, and owing to the lack of well-maintained roads between the main settlements, travelling was difficult. In order to facilitate the work in the field, Reinwardt hired numerous hunters, plant collectors, butterfly hunters, a cook, and local porters to carry the collecting equipment and food provisions, which were packed in large boxes called *dongdang.* Ultimately the caravan consisted of more than a hundred people.[53]

The Brussels landscape painter and architect Antoine Auguste Joseph Payen (1792-1853) also accompanied Reinwardt on his expedition through the Preanger. Payen had been directly appointed and instructed by Willem I. Similar to other landscape painters who had joined British and French expeditions to the Pacific and India in the second half of the eighteenth century, Payen was commissioned to produce paintings and drawings illustrating the general characteristic of the landscape of the Dutch colony.[54] Payen's most important teacher was the landscape painter Henri Asche (1775-1841) who ran a studio in Brussels. Asche taught Payen how to make preliminary sketches in the field with watercolours and oil paint. The field sketches formed the central basis for colourful paintings which were finished in the seclusion of the painter's studio.[55] Payen had never had the opportunity to refine his painting technique on a Grand Tour through Italy which, at that time, was one of the essential elements of a landscape painter's training. His tour to the Dutch colonies was to compensate for this lack in his education.[56]

The expedition first moved to Ciampea, an estate a couple of miles west of Buitenzorg, where Reinwardt and his European personnel were accommodated in the spacious country house of the Riemsdijk family. The Riemsdijks were one of the biggest landowners in the hinterland of Batavia.[57] Various family members had held high positions within the colonial bureaucracy in Java. In Ciampea, the brothers Petrus Wilhelmus Helvetius van Riemsdijk (1780-1857) and Willem Vincent Helvetius van Riemsdijk

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[53] Scalliet, *Antoine Payen,* 269: Journal I, Payen, entry: March 1819.

[54] On the appointment of Payen, see M.-O. Scalliet, "'Back to Nature' in the East Indies," in *Pictures from the tropics. Paintings by Western artists during the Dutch colonial period in Indonesia*, ed. M.-O. Scalliet, et al., 44-47 (Amsterdam: Koninklijk Instituut voor de Tropen, 1999).

[55] Scalliet, *Antoine Payen,* 17-30.

[56] Scalliet, "'Back to Nature' in the East Indies," 47-49.

[57] Knight, "Estates and plantations in Java," 136-7. For more information on the Riemsdijk family see also P.R. Feith and P.C. Bloys van Treslong Prins, *De bekende landheer van Tjampea c.a. Willem Vincent Helvetius van Riemsdijk* (Batavia: Kolff, 1933).

(1784-1847) provided Reinwardt and his staff with practical information about the region and accompanied them on day trips to the close vicinity. Reinwardt and his assistant Kent used these small trips to collect and describe plants, birds and insects. His draftsmen made first sketches of the gathered items.[58]

After a brief stay at a nearby place called Sadang where Reinwardt and his European and indigenous helpers continued their collecting, the entire caravan headed for Gunung Parang, a large private estate in the southern part of the Preanger district. The caravan aroused curiosity among the inhabitants of the smaller villages they passed. In one, a group of villagers approached Bik and asked about the travellers' aims. They were especially interested in the large number of metal drums which contained the plant and animal specimens collected by the expedition. Bik recorded in his diary:

> It was not easy to answer this question and to give them a good understanding of what we are doing. We said that the professor was a important physician [*doekan besar*] and that all the plants and animals were collected in order to prepare various medical drugs in order to be able to cure all diseases. This answer, which was partly true, satisfied them and even made them think highly of us.[59]

In the third week of April 1819, the caravan reached Sukabumi, where they were welcomed by Andries de Wilde (1781-1865), who lodged them in his spacious country house. De Wilde was co-owner and administrator of a large private estate which stretched as far as the southern coast of the island. De Wilde was born in Amsterdam and had re- ached Java in 1803. After his appointment as surgeon he had been named inspector of coffee cultivation, first in the Buitenzorg district and later the Preanger district.[60] De Wilde had bought Sukabumi in 1813, when Raffles initiated the selling of huge tracts of

[58] KITLV Leiden, H 596, Travel diary J. Th. Bik, entries 20 and 21 March 1819.

[59] Ibidem, entry 10 April 1819: "Het was niet gemakkelijk om deze vraag te beantwoorden en hun daarvan eene goede begrip te geven. Wij zeiden hun dat professor eene doekan besaar was, en dat alle die planten en beesten, moesten dienen om daaruit verschillende geneesmiddelen te bereiden om alle ziekten te kunnen genezen. Dit antwoordt dat gedeeltelijk waarheid bevatte was voor hun bevredigend en deed hun tevens een goede dunk van ons op vatten."

[60] For a detailed biography of De Wilde, see De Haan, *Priangan*, vol. 2: *Personalia*, 284-87.

land in Krawang and the Preanger regions. The second owner of the estate was Nicolaus Engelhard.[61]

De Wilde's and Engelhard's investment turned out to be a success. Owing to high coffee prices on the world market in the aftermath of the Haitian Revolution of 1791-1804, the landowners profited immensely from the large coffee plantations on their estate. The improvement of the irrigation system which Bik praised in his diary further increased the efficiency of this agricultural enterprise.[62] Bik summarized the brief stay in Sukabumi as follows:

> It was good that we stayed here for only two days, otherwise we would have forgotten our 'rustic' [*bosche*] life and it would have cost us much effort to change our simple meals [*tafel*] for the ones of Sukabumi.[63]

Already one day after their arrival, Reinwardt, De Wilde and the local district officer organized a meeting to plan the remainder of their tour through the Preanger.[64] De Wilde had already accompanied Raffles on a similar expedition through the area.[65]

One week later, the caravan reached the top of the Gunung Gede volcano, where they set up a large camp. In the meantime a number of indigenous rulers had joined the group, and one of the regents had even provided the expedition with six fresh horses and food.[66] Reinwardt and his crew used the days to come to investigate the geology of the crater and to measure the position and height of the neighbouring mountains. One of the things which attracted Reinwardt's companions was the basalt formations, for as Bik put in his diary, "it is not yet decided among the geologists

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[61] Knight, "Estates and plantations in Java," 45.

[62] For an overview of De Wilde's years as landowner, see De Haan, *Priangan*, vol. 2: *Personalia*, 287-309.

[63] KITLV Leiden, H 596, Travel diary J. Th. Bik, entry: 11 April 1819: "Het was goed dat wij hier slechts twee dagen bleven, want anders hadden wij spoedig ons bosche leven vergeten en het had ons veel moeite gekost om onze eenvoudige tafel voor die van Sukabumi te verwisselen."

[64] Scalliet, *Antoine Payen,* 269: Journal Payen I, entry: 13 April 1819.

[65] A. de Wilde, *De Preanger Regentschappen op Java gelegen* (Amsterdam: M. Westerman, 1830), 20-5.

[66] KITLV Leiden, H 596, Travel diary J. Th. Bik, entry 14 April 1819.

whether the basalt clods have been created by fire or water."[67] Payen and the Biks prepared several drawings and sketches of the crater and the surrounding area. The field work at the top of the Gunung Gedeh was a cooperative enterprise. Classifying and naming plants, animals and localities was an especially complex endeavour in which local helpers played an important role. In one of the entries in his travel diary Bik put it as follows: "We were accompanied by a local who knew many names of plants, mountains and rivers."[68]

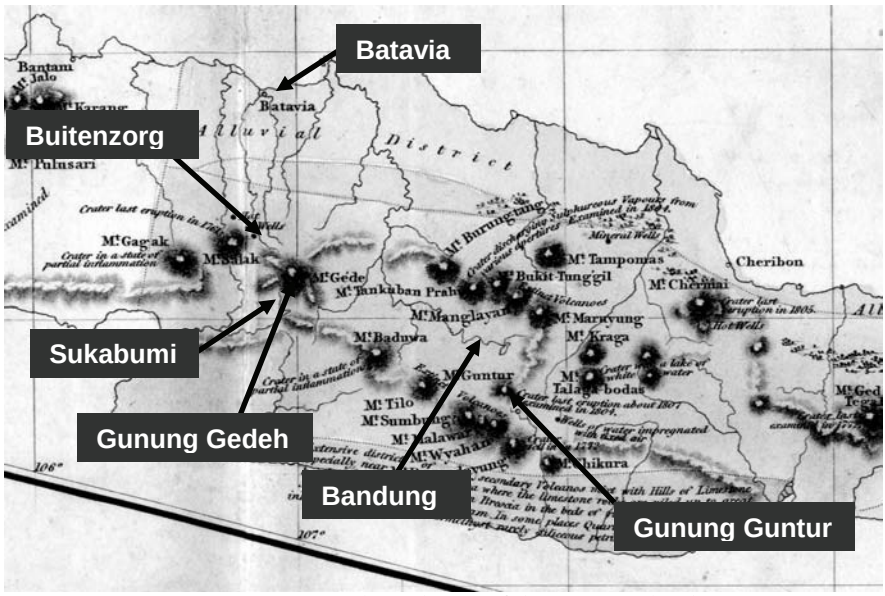

Figure 29: Mineralogical map of the Preanger by the American naturalist Thomas Horsfield.

The caravan was regularly visited by local regents who often accompanied Reinwardt and his helpers for a while and sometimes even organized the performance of local dances and small gamelan concerts.[69] In the small village of Cipetir, near the border of the Bandung district (the Preanger region was divided into four administrative districts at the time), they were received by a local noble called Rajamandala. The regent of

[67] Ibidem, entry 17 April 1819: ". . . het is onder de geologen nog niet beslist of die basalt klompen door het vuur of door het water zijn ontstaan."

[68] Ibidem: "Wij hadden een inlander bij ons welke zeer ervaren was in alle benamingen van planten, bergen en rivieren."

[69] Scalliet, *Antoine Payen,* 269: Journal Payen I, entry: 24 April 1819.

Bandung had ordered Rajamandala to welcome Reinwardt and guide him through the district.[70] Rajamandala had previously helped the cartographer and military Pieter Johannes Beetjes to prepare a topographical map of the Preanger region in 1814.[71]

Besides drawing and sketching plants which Reinwardt and Kent had collected, Bik and Payen also had to map out certain regions. In September 1819, Reinwardt ordered them to prepare a detailed map of the area around the Gunung Guntur volcano. The map was to serve as basis for a mineralogical description of the volcano and the near environs. Reinwardt, in particular, wanted to chart the different lava streams which he had recognized while climbing the volcanoes a couple of days before.[72]

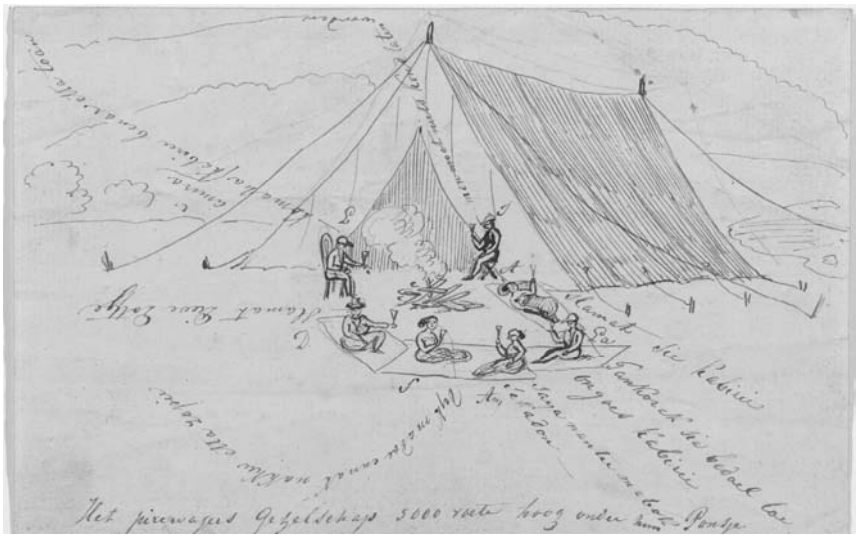

Figure 30: A field sketch of Reinwardt, his helpers and three Sundanese women made by his draftsman Jannes Theodorus Bik.

In addition to collecting and compiling maps, Reinwardt continued to assist the colonial government in Batavia. Attention to the administration of the military school in Semarang and the organization of the health system was especially costly in terms of time. Bik recorded in his diary: "Sometimes it was raining official letters, which he [Reinwardt] decided to answer in the

[70] Ibidem, 269: Journal Payen I, entry: 25 April 1819.
[71] F. de Haan, "Personalia der periode van het Engelsch bestuur over Java 1811-1816," *Bijdragen tot de Taal-, Land- en Volkenkunde in Nederlandsch-Indië* 92 (1935): 497-98.
[72] KITLV Leiden, H 596, Travel diary J. Th. Bik, entry 2 September 1819.

evening hours; and often bundles of documents which Reinwardt had reviewed and offered advice about were dispatched to Batavia."[73] In other words, the letters from Batavia did not stop.[74]

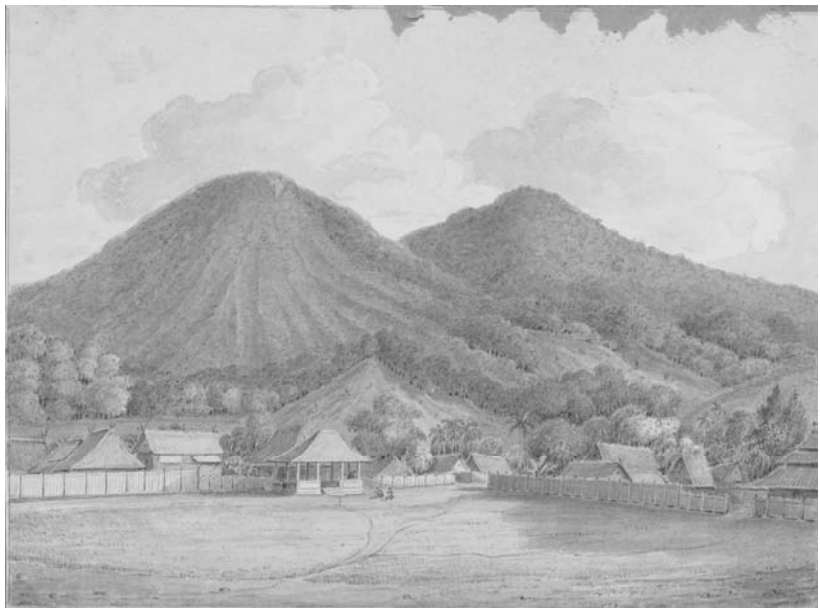

Figure 31: Sketch of a village in the Preanger with two volcanoes in the background made by Jannes Theodorus Bik (1819).

In October 1819, Reinwardt received a letter from Van der Capellen ordering him to depart immediately for Semarang in his function as curator of the military school and administrator of the health service. Since Reinwardt had expected that his stay in Semarang would take longer, he decided to send the caravan back to his house in Buitenzorg. He further instructed his companions to prepare the large number of collected birds, plants, stones and animals for shipping to Europe.[75] A quick shipment of the

[73] Ibidem, entry: 6 May 1819: "[H]et regende dan soms ook van officiële brieven waartoe hij [A.W.: Reinwardt] meestal den avond koos om dezelve te beantwoorden en gingen dikwijls bundels met stukken naar Batavia terug waarop Professor zijn consideratien en advies had gegeven."

[74] Ibidem, entry: 22 September 1819.

[75] Ibidem, entry: 13 October 1819.

collected items was necessary in order to protect them from detrimental environmental influences such as humidity and vermin.[76]

An Unexpected Appointment at Home

In January 1820, the end of Reinwardt's tenure as Director of Agriculture, Arts and Sciences was rapidly approaching. According to his instructions, decreed by the Dutch king Willem I in January 1815, his time on Java was limited to a period of at most four years, which meant that he had to leave Java around April 1820. In a long letter to Van der Capellen, Reinwardt argued for an extension of his stay in the Malay Archipelago on the grounds that his natural historical inquiry had not yet attained the peak of perfection and completeness. In particular the expedition through the Preanger region had shown that in-depth field work was necessary to meet the expectations of the king and the public in the Netherlands. Reinwardt thus proposed to the Governor General that his stay in the Dutch colony be prolonged for one year, or even better until the end of 1821.[77] Van der Capellen immediately forwarded Reinwardt's request to Willem I in the Netherlands.[78]

Yet it turned out that there was little to negotiate. In his absence, decisions had already been made. In early 1820, Reinwardt heard from his friends De Vries in Amsterdam and Van Marum in Haarlem that he had been appointed as professor of chemistry, botany and natural history and director of the botanical garden at the University in Leiden, as successor to Sebald Justinus Brugmans, who had abruptly passed away.[79] Reinwardt, who knew Brugmans from his years as a member of the First Class of the Royal Institute in Amsterdam, first doubted whether he should accept the position. In a letter to De Vries he complained that neither his friends in the Netherlands nor the authorities had informed him about his appointment. Reinwardt feared that the position in Leiden could not compensate for the loss of his functions as director of the State Cabinet of Natural History or as professor of natural history, chemistry and botany at the Athenaeum Illustre

[76] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Batavia, 10 February 1817.

[77] De Vriese, *Reinwardt's reis*, 295, letter Reinwardt to Gouverneur Generaal Van der Capellen, Buitenzorg, 6 January 1820.

[78] NA The Hague, Ministerie van Koloniën, 1814-1849, inv. 2452: Decision of the Gouverneur Generaal, 15 January 1819, 18.

[79] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Buitenzorg, 23 February 1820.

in Amsterdam. Moreover, he was concerned about his salary and he feared that the professorship would prevent him from preparing more extensive publications on his fieldwork in the Netherlands Indies. In the end, he accepted the offered position rather grudgingly.[80] In another letter written in September 1820, he complained about the fact that the curators of the Athenaeum Illustre had failed to give him any sign of their appreciation of his work, which definitely would have changed his mind.[81]

A Last Journey to the Moluccas

However, before Reinwardt returned to the Netherlands, the king eventually allowed him to carry out a sea expedition to the eastern part of the Malay Archipelago, a region where the colonial authority was barely established.[82] The political influence of the Dutch district officers was often restricted to the boundaries of their small coastal settlements which the merchants of the Company had established in the course of the seventeenth and eighteenth centuries.[83] A chronological and detailed account of this expedition, which took place from January 1821 until March 1822, was made public after Reinwardt's death in 1858 by Willem H. de Vriese (1806-1862), who succeeded Reinwardt as professor for botany at Leiden University. The voluminous report of the expedition, which is evidently based on Reinwardt's field notes, sheds light on various improvised and spontaneous processes of knowledge accumulation in the field.[84] Reinwardt almost completely depended on the available colonial infrastructure and on various local informants throughout this trip.[85]

Reinwardt travelled on the ship *Experiment*, which was chartered by the colonial government. His research crew consisted of a gardener, two draftsmen, and a personal servant, called Philips, and someone from Borneo, who presumably had to serve as translator during the trip. Furthermore the traveller was accompanied by three locals who were responsible for the collection of plants and insects and the preparation of specimens in the field.

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[80] KB The Hague, 121 B 8, letter Reinwardt to De Vries, 30 June 1820.

[81] Ibidem, 30 September 1820.

[82] The following section is based on: A.Weber, "Encountering the Netherlands Indies," *Itinerario* 33 (2009): 51-54.

[83] E.M. Jacobs, *Merchant in Asia. The trade of the Dutch East India Company during the eighteenth century* (Leiden: CNWS Publications, 2006), 13-40.

[84] UB Leiden, BPL 2425, 6 and 12.

[85] See De Vriese, *Reinwardt's reis,* 305-643.

The ship's crew, as Reinwardt reports, consisted of twenty five persons among whom were Bengalis, people from South Africa, Javanese, and a Chinese carpenter. Local people also regularly supplied them with sufficient fresh food which they received in exchange for flintlocks and gunpowder.[86]

Travelling on land itself was—at least for Reinwardt—a rather comfortable endeavour, since he was either carried in a litter (*draagstoel*) or could make use of horses or carriages provided by local colonial officials; only in special cases did he have to walk by himself. His litter was normally carried by four local porters. A fifth person took care that that it remained balanced. Reinwardt noted in his account the following:

> This mode of travelling is above every other [mode] comfortable; the carriers walk very quickly and I was quite astonished that they were carrying us over steep hills, sometimes even running, particularly when the carriers of one chair spurred on those who carried another by challenging and competing with them.[87]

During his visit to Menado, the administrative capital of Celebes, Reinwardt recorded that the service of being carried for free was part of an earlier VOC agreement with the various indigenous rulers. Each of those rulers had to provide carriers when Dutch officials were crossing their district.[88]

Encounters on the different islands always followed the same pattern. After having called at the respective harbour, Reinwardt and his helpers were received and welcomed by the local Dutch district officer or missionaries, who subsequently gave him an account of the local situation. This briefing comprised information on the political relations between the Dutch and the indigenous rulers, about earthquakes, volcanic eruptions, floods, agriculture, the local religion, special customs, the population, etc. After that, Reinwardt often visited the local rulers in order to complete his information. Those encounters were highly ritualised. In many cases Reinwardt was accompanied

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[86] Ibidem, 307-8 and 333.

[87] Ibidem, 376: "Deze wijze van reizen is boven elke andere gemakkelijk; de dragers gaan zeer snel en ik verwonderde mij niet weinig, dat zij ons met het grootste gemak over het steile gebergte droegen, somtijds zelfs in een snellen loop, vooral wanneer de dragers van den eenen stoel die van eenen andere, door uitdaging en wedijveren met elkander, aanmoedigen."

[88] Ibidem, 544.

by Dutch officials and a translator who mediated between him and the indigenous rulers.[89]

On Timor, the Dutch district officer even organized an expedition to the hinterland, where Reinwardt hoped to find gold and copper. Since the diplomatic and political relations with Timor's hinterland rulers appeared to quite weak and uncertain, the resident had to bring together a small army (roughly 300 armed persons) which eventually accompanied the naturalist and his companions. A local Chinese served as guide to the column. During the expedition Reinwardt met several local rulers, observed and collected plants and animals and analysed rock samples. However, the expedition did not reach the river where gold and copper was assumed to be, since some of the accompanying princes refused to continue the trip inland due to a supposed lack of food. Reinwardt's final judgement regarding the situation in Timor was sober, clear, and obviously directed toward the interest of his imperial sponsor: "It is a great pity that this place is so much in decline. The frequent mutual wars … between the many weak princes and rulers must be blamed for this. Those [wars] must stop. A single and uniform administration must be introduced. This would allow the safe opening, exploration and exploitation of the metal mines."[90]

The reconstruction of Reinwardt's fieldwork in the Moluccas and in the Preanger region has shown how much the investigation of nature in the field was based on cooperation with local informants and further, how much he depended on an entire hierarchy of assistants, ranging from servants to draftsmen. In areas where colonial infrastructure barely penetrated, travellers such as Reinwardt depended heavily on the support and goodwill of peasants, local rulers and European landowners. They helped travellers such as Reinwardt to identify, name, and structure their observations in the field. This collaborative fieldwork was essential to the large-scale collection of plants, animals and minerals and the preparation of visual representations of these specimens. With the help of his draftsmen, Reinwardt mapped out the geography and vegetation of the visited territory in the form of field sketches and maps.

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[89] Ibidem, 320.

[90] Ibidem, 361: "Het is dus te bejammeren, dat deze plaats thans zoo zeer in verval is. De veelvuldige onderlinge oorlogen … van de menigte kleine Vorsten en Hoofden, zijn daaraan voornamelijk schuld. Deze moesten ophouden. Een eenig en eenparig bestuur moest worden ingevoerd. De metaalmijnen konden dan met veiligheid geopend, onderzocht en misschien met groot voordeel bewerkt worden."

Forging a New Identity

Already in the Netherlands Indies, Reinwardt intensified his reflections about his identity as a 'scientific traveller'. In January 1819, briefly after his return from the Preanger expedition, he had sent Van Marum sketches made by his draftsmen and living specimens of five plants which, in his opinion, had not yet been described and classified by other botanists such as Georg Everhard Rumphius in his *Herbarium Amboinense* (1741). Reinwardt asked Van Marum to cultivate the plants in the hothouse at Plantlust in Haarlem until his return. Since Reinwardt was insecure how to go about preparing and arranging the publication of a *Flora Javanicorum*, he asked Van Marum for advice. Reinwardt was particularly concerned about whether sufficient funding and a suitable engraver could be found in the Netherlands. One of the few options was the engraver Van Beek who had produced the plates for Dietrich Georg Kieser's *Mémoire sur l'organisation des plantes*, which had appeared as eighteenth volume of Teyler's Second Society in 1814. Reinwardt even authorized Van Marum to forward the drawings to Van Beek or someone else, in order to produce proof plates that could be used to attract sponsors for his publication. In order to complete the set, Reinwardt added short texts in which he described the specific features of these five plants. At a later stage, he planned to add observations on the physiognomy and 'oeconomy' of the chosen plants.[91]

Reinwardt also informed Van Marum that he had prepared enough written descriptions and illustrations of birds, insects and snakes to serve as the basis for an illustrated work on the fauna of Java. While he was confident in the originality of his botanical work, he was less certain about whether he had named the animal specimens correctly and whether they had not already been described by others. He hoped that the bird expert Coenraad Jacob Temminck (1778-1858) would help him to detect unknown species among the collected items.[92]

Besides more descriptive monographs on his botanical and zoological investigations in Java, Reinwardt harboured plans to transform his field notes into a coherent travel narrative as other travellers had done before him. In particular the French and British expeditions under the command of John Byron (1723-1786), Samuel Wallis (1728-1795), Philippe Carteret (1733-1796), Louis Antoine de Bougainville (1729-1811) and James Cook (1728-1779) to the Pacific after the Seven Years' War had triggered the

[91] Ibidem, letter Reinwardt to Van Marum, Buitenzorg, 10 January 1819.
[92] Ibidem.

publication of lavishly produced travel narratives and descriptions of regions that lay beyond the horizon of Europe's learned world. The narrative strategies of these accounts were diverse. While most authors gave a chronological description of their journey based on their travel diaries, others decided to summarize their observations according to self-defined categories. In *Observations made during a voyage around the world, on physical geography, natural history, and ethic philosophy* (1777), Johann Reinhold and Georg Forster, who had accompanied Cook on his second circumnavigation from 1772 to 1775 summarized their findings by using the following six labels: the earth and its strata, water and the ocean, changes of the globe, the atmosphere, organic bodies and human species.[93]

Figure 32: Illustration from Temminck's *Histoire naturelle des pigeons* (1808).

[93] For a thorough contextualization and analysis of a large number of these travel accounts, see J. Osterhammel, *Die Entzauberung Asiens. Europa und die asiatischen Reiche im 18. Jahrhundert* (München: C.H. Beck, 1998).

To foster curiosity among his readers in the Netherlands, Reinwardt rejected all requests from journals and institutions in the Netherlands to send them pieces about his field work, for as he put it, "[i]s there a traveller, who has published his field diary before he has returned?"[94] However, a brief analysis of one of his lectures, held at the Batavian Society of Arts and Sciences in April 1821, sheds more light on the construction of his identity as a 'virtuous' administrator and 'heroic' traveller.[95] The society was one of the most important forums for the colony's elite to socialize, gossip and discuss the latest surveys and curiosities of the Malay Archipelago's nature and geography. Since 1815, the society had held its irregular meetings in a new building in Weltevreden, one of the southern suburbs of Batavia.[96] Reinwardt's lecture, which carried the title *Over de hoogte en verdere natuurlijke gesteldheid van eenige bergen in de Preanger Regentschappen* (On the height and further natural disposition of a few mountains in the Preanger administrative districts) was eventually published in the ninth volume of the Batavian Society's proceedings.

Reinwardt opened his presentation by stressing the usefulness and importance of his expeditions to the Preanger region. Altitude measurements in the hilly interior of Java were essential to gain more insight into the island's natural diversity and agricultural and economic wealth. In order to prove the virtue of his field work, Reinwardt emphasized the accuracy of his measurements, which far exceeded the precision of earlier surveys. Although earlier surveyors such as Raffles, the plant expert and chemist Horsfield, and the physician H.B. Henke in Yogyakarta, had also used standardized thermometers as measuring devices, Reinwardt argued that their figures were too incoherent to count as dependably accurate.[97]

Before Reinwardt presented the actual results of his fieldwork, he first informed his readers about his instruments and his own methods of measuring. To increase the accuracy of measurements in the field, Reinwardt advocated the combined use of thermometers and barometers manufactured

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[94] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Bandung 16 August 1819: "[w]at reiziger is er, die zijn Journaal voor zijne terugkomst heeft laten drukken?"

[95] This lecture was later published in the Society's proceedings: C.G.C. Reinwardt, "Over de hoogte en verdere natuurlijke gesteldheid van eenige bergen in de Preanger-Regentschappen," *Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen* 9 (1823): 1-36.

[96] Groot, *Van Batavia naar Weltevreden*, 157-93

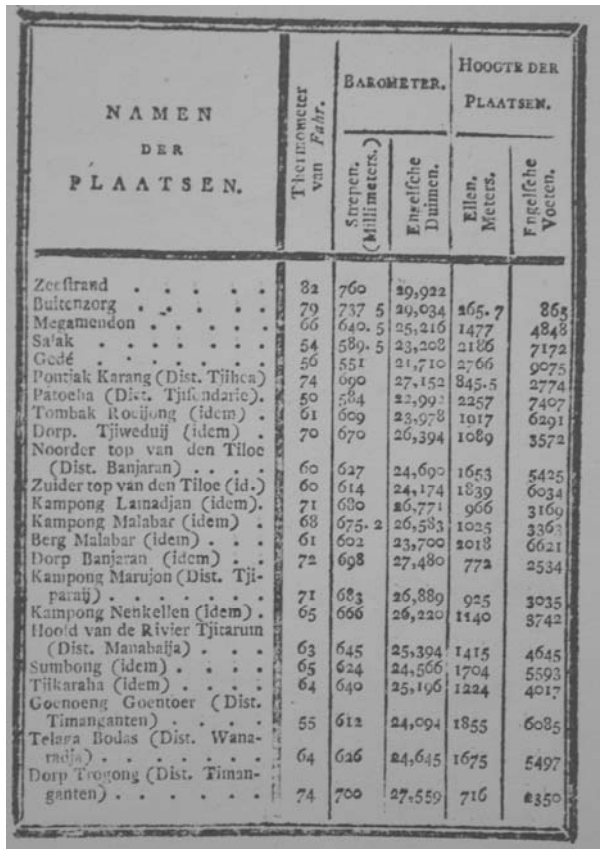
[97] Reinwardt, "Over de hoogte en verdere natuurlijke gesteldheid," 3-7.

by British and Dutch instrument makers. Since, in his experience, the British thermometers had proven more dependable then the Dutch ones, he had based his field notes mainly on the British instruments. His so-called mountain barometers, or travel barometers, had a more compact design than regular barometers. Because the British and Dutch instruments used different units of measurement, he had to convert the different values continuously in order to obtain comparable numbers. Here Reinwardt advocated using the formulas mentioned in Johann Friedrich Benzenberg's manual on the use of travel barometers titled *Beschreibung eines einfachen Reisebarometers. Nebst einer Anleitung zur leichten Berechnung der Berghöhen* (Description of a simple travel barometer with a manual for the easy calculation of the height of mountains), published in Düsseldorf in 1811. In order to illustrate and document the accuracy of his measurements, Reinwardt added a detailed table to his published account.

In order to reach a high degree of accuracy in the field, Reinwardt also advised his readers to use two thermometers simultaneously. One instrument should be combined with a barometer in a cylindrical case, while the other was directly exposed to the air in a shady place, for instance under a tree. If the measurements of both thermometers differed, the extra barometer could be used to calculate a more exact value by using the tables in Benzenberg's manual. This technique could be applied at sites where measuring travellers could only stay for a short time, such as at the top of volcanoes.

On top of this, Reinwardt recommended that his readers check the accuracy of their results by using a eudiometer produced by the Italian instrument maker and physician Felice Fontana. Eudiometers were usually used by chemists and physicians to measure the quantity and quality of airs and gases. In late eighteenth- and early nineteenth-century Europe, eudiometry served as an important tool to survey the 'atmosphere' in which the citizens of a country lived. By measuring the air at hospitals, farmlands, canals, graveyards and marshland, administrators such as Fontana had successfully promoted 'eudiometry' as a tool to improve public health by forecasting or preventing famine and epidemic diseases. Many believed that environmental factors had a major impact on people's physical and moral health. Trained state experts who were able to handle and calibrate such a complex instrument in the field thus became a welcome tool for

administrators to demonstrate their ability to manage and govern the public body efficiently.[98]



NAMEN DER PLAATSEN.	Thermometer van *Fahr.*	BAROMETER. Strepen. (Millimeters.)	BAROMETER. Engelsche Duimen.	HOOGTE DER PLAATSEN. Ellen. Meters.	HOOGTE DER PLAATSEN. Engelsche Voeten.
Zeestrand	82	760	29,922		
Buitenzorg	79	737 5	29,034	265. 7	865
Megamendon	66	640. 5	25,216	1477	4848
Salak	54	589. 5	23,208	2186	7172
Gedé	56	551	21,710	2766	9075
Pontiak Karang (Dist. Tjiheа)	74	690	27,152	845.5	2774
Patoeha (Dist. Tjisondarie).	50	584	22,993	2257	7407
Tombak Roedjong (idem) .	61	609	23,978	1017	6291
Dorp. Tjiweduij (idem) .	70	670	26,394	1089	3572
Noorder top van den Tiloe (Dist. Banjaran)	60	627	24,690	1653	5425
Zuider top van den Tiloe (id.)	60	614	24,174	1839	6034
Kampong Lamadjan (idem).	71	680	26,771	966	3169
Kampong Malabar (idem) .	68	675. 2	26,583	1025	3363
Berg Malabar (idem) . . .	61	602	23,700	2018	6621
Dorp Banjaran (idem) . .	72	698	27,480	772	2534
Kampong Marujon (Dist. Tjiparaij)	71	683	26,889	925	3035
Kampong Nenkellen (idem) .	65	666	26,220	1140	3742
Hoofd van de Rivier Tjitarum (Dist. Manabaija) . . .	63	645	25,394	1415	4645
Sumbong (idem)	65	624	24,566	1704	5593
Tilkaraha (idem)	64	640	25,196	1224	4017
Goenoeng Goentoer (Dist. Timanganten)	55	612	24,094	1855	6085
Telaga Bodas (Dist. Wanaradja)	64	626	24,645	1675	5497
Dorp Trogong (Dist. Timanganten)	74	700	27,559	716	2350

Figure 33: A table added to the text of Reinwardt's lecture which was meant to prove the accuracy of his altitude measurements in the Preanger region.

In the remaining part of his speech, Reinwardt combined his altitude measurements with his geological and botanical investigations

[98] For a more general attempt to capture the hidden career of 'eudiometers' in administration *and* science, see S. Schaffer, "Measuring virtue: Eudiometry, enlightenment and pneumatic medicine," in *The medical enlightenment of the eighteenth century*, edited by Andrew Cunningham et al. (Cambridge: Cambridge University Press, 1990), 281-318. For the difficulty of handling and calibrating eudiometers, see L. Roberts, "Eudiometer," in *Instruments of science: An historical encyclopedia*, edited by Robert Bud, et al. (London: Garland, 1998), 234-36.

carried out in the Preanger mountains. Like Alexander von Humboldt in his *Ansichten der Natur* (Views of nature, 1805), Reinwardt took his readers on a virtual tour along the hills of the Preanger.[99] Since Reinwardt quotes Van Humboldt's study in the footnotes in the published version of his lecture, he must have possessed a copy of the latter´s travel narrative.[100] His tour started at the foot of the mountains. Or as he put it:

> We are entering the natural forests which cover the foot of the basalt mountains and which are characterized by a surprisingly luxuriant growth, heavy and extraordinarily high trees, by a large number of climbing plants; at the same time, the ground consists of a deep layer of black and very fertile mould.[101]

He then continued with a brief description of the forests which covered the mountains in the Preanger region until a height of 5000 feet. From then on the vegetation gradually changed and a tree which local people called *kimarak* dominated the landscape. Reinwardt could only guess that this further unknown tree belonged to the cypress family. Another shift of the vegetation appeared at the height of around 7000 feet. At that height, trees gradually vanished and shrubs, flowers, herbs and lichens now dominated the flora. As Reinwardt put it, "All plants show entirely different forms those that one usually observes in the lower parts, and the whole reminds us of the Alpine mountains in the cooler North."[102]

In his subsequent floral description of a plain area close to the Gunung Patuha volcano, situated fifty kilometres southwest of Bandung, Reinwardt again stressed the economic importance of his fieldwork. For only

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[99] For a contextualization of Von Humboldt's narrative practices, see M.-N. Bourguet, "Landscape with numbers. Natural history, travel and instruments in the late eighteenth and early nineteenth centuries," in *Instruments, travel and science. Itineraries of precision from the seventeenth to the twentieth century*, ed. M.N. Bourguet, et al. (London: Routledge, 2002), 96-125.

[100] Reinwardt, "Over de hoogte en verdere natuurlijke gesteldheid," footnoot (p).

[101] Ibidem, 28: "Wij betreden dadelijk de natuurlijke bosschen, die den voet van het basalt-gebergte overdekken, en die door eenen verbazend weelderigen groei, zwaar en ongemeen hoog geboomte, eene zeer groote menigte van slingerplanten, gelijk de grond door eene diepe laag van zwarte zeer voedzame plantaarde gekenmerkt worden."

[102] Ibidem, 32:"[A]lle gewassen vertoonen geheel andere vormen, dan men gewoon is in de laagte te aanschouwen, en het geheel herinnert ons aan het Alpisch gebergte van het koudere noorden."

the combination of accurate measurement and travelling 'in the field' would allow one to determine where foreign and economically rewarding crops could be cultivated. The plain close to the Gunung Patuha, near a village called Tjisondari, would for instance offer an ideal natural environment for the cultivation of European cash crops, for the region's flora resembled the flora of temperate zones in other parts of the world.[103]

This brief analysis of Reinwardt's lecture has shown that Reinwardt's identity as a traveller was rooted in his hybrid function as administrator, surveyor and natural historical investigator. Instead of providing an account of Java's nature based on the observation and description of certain plant or tree families in the form of monographs or articles as his assistant Blume or the American naturalist Horsfield were working on, Reinwardt decided to link the outcome of his supposedly carefully made measurements with his heroic journeys through the wilds of Java. Through Reinwardt's steadfast heroism, the virtue of his instruments and their measurements could be harnessed to a project of laying bare the truths of nature in the colonies for the purpose of understanding and governing exploitation.

Conclusion

This chapter has shown that 'travelling' was a tool common to both colonial governance and science. While the 'travelling' General Committee was a powerful demonstration of authority for local rulers and provincial colonial civil servants, Reinwardt used the field trips to collect natural historical specimens and statistical data on the political, economic and social situation in more remote provinces. In particular during his tour through the Preanger and the eastern part of the Malay Archipelago Reinwardt gathered a broad array of 'oeconomic' knowledge which served as basis for official reports and, of course, his travel account.

However, the reconstruction of a joint tour of inspection through Java has shown that surveying and 'improving' Java *in situ* was a complex endeavour. Although provincial colonial servants received a regular salary from the colonial government in Batavia, many of them were only partly interested in supporting the General Committee with their work. Influential families such as the Riemsdijks and the IJsseldijks, whose members still held various positions within the colonial administration, feared that the 'new-comers' and their liberal ideas would undermine their status and wealth. The

[103] Ibidem, 34-35.

General Committee and Reinwardt thus had to carefully weigh and evaluate the information which they received on the spot. Since Reinwardt possessed broad 'oeconomic' experience, he was continuously asked to advise the colonial government on pressing administrative issues, as wide-ranging as the cultivation and exploitation of export products from coffee to indigo, the minting of coins and the production of saltpetre. In particular, the application of instruments as thermometers, barometers, aerometers and eudiometers allowed Reinwardt to back his reports and recommendations with a broad and impressive array of putatively accurate numbers. No one within the colonial bureaucracy who had seen the long tables and seemingly complicated measurements would dare to question his ability as administrator.

The last part of this chapter has shown that Reinwardt was also deeply concerned about his identity and role as 'scientific traveller'. To claim such a mantle back in the Netherlands, Reinwardt pursued a dual strategy. He hoped that his own collection of plants and animals would provide him a strong basis for illustrated monographs on the flora and fauna of Java and the Moluccas. As the analysis of his speech in front of the members of the Batavian Society of Arts and Sciences has shown, he simultaneously sought to fashion himself as lonely and 'heroic' traveller and 'virtuous' administrator, who had dared to encounter Javanese nature and society. Reinwardt thus hoped that a narrative that set the act of accurate measurement in the context of a 'heroic' journey would help distinguish him from competitors such as his younger assistant Blume and the American plant expert and traveller Horsfield, whose in many ways simpler strategy was simply to describe, classify and name as many of the plant and animal species they had collected as they could.

In the end, Reinwardt's strategy failed. The following chapter will show that powerful governmental patrons such as the Dutch king Willem I increasingly doubted that Reinwardt—or more generally the General Committee—had used the proper administrative tools to transform the colony into a financially rewarding endeavour. Reinwardt's claim that only a 'new natural history' based on travelling and accurate measurements in the field had the potential to unravel mysteries of the natural wealth of the colony received hardly any support in the Dutch kingdom. Neither Willem nor his ministers were willing to support a 'virtuous' administrator who had returned from the colony empty-handed with the financial means to prepare an account of his supposedly 'heroic' journey through the Malay Archipelago.

PART III

Leiden

6

Leiden as a Difficult Landscape for a Late Career

As the products and resources of an entire empire cannot be known unless one has surveyed all provinces, cities, villages and citizens, everyone who wants to understand nature better and more thoroughly must have surveyed the different parts of the earth.

Reinwardt, about his field work in the Netherlands Indies in his inaugural lecture in Leiden in 1823.[1]

When Reinwardt landed at Texel in autumn 1822, the political climate in the Netherlands had changed tremendously. After the collapse of the French empire in 1815, Willem I and his advisors had initiated numerous projects to transform Napoleon's former satellite into a powerful and influential nation-state with an economically rewarding colonial appendix in the Netherlands Indies. The economic prospects seemed promising. While the southern provinces possessed a flourishing textile industry and plentiful natural resources such as pit coal, the commerce-oriented northern provinces were poised to organize the shipping of finished textiles and industrial products to the Netherlands Indies. On their passage back, the ships were supposed to

[1] Reinwardt, *Over hetgeen*, 23: "Want, gelijk de goederen en rijkdommen van een geheel rijk niet kunnen gekend worden, ten zij men alle de provinciën, steden, dorpen en burgers gade sla; zoo moet ook ieder, die de natuur volkomen en grondiger verlangt te kennen, de onderscheidene gewesten der aarde doorzien hebben."

bring colonial products such as cloves, nutmeg, tea and coffee to the Netherlands. Newly established financing and commerce agencies such as the Funds for the Stimulation of the National Industry (Fonds ter aanmoediging der Nationale Nijverheid, established in 1821), the General Netherlands Society for the Support of the People's Diligence (Algemene Nederlandsche Maatschappij ter begunstiging van de volksvlijt, 1822), the Amortization-Syndicate (Amortisatiesyndicaat, 1822) and, most important, the Dutch Trading Society (Nederlandsche Handel-Maatschappij, 1824-25) had to enhance the formation of an economically strong nation state.[2]

These economic projects were paralleled by cultural and scientific reforms. In order to promote the unity and grandeur of the Dutch kingdom, the king actively supported societies such as the Dutch Bible Society (Nederlandse Bijbel Genootschap, 1814) and the Society of Benevolence (Maatschappij van Weldadigheid, 1818). The latter society had initiated the establishment of agricultural colonies for impoverished people in Drenthe. Moreover, the king strengthened and enlarged cultural institutions which had been established in the aftermath of the Batavian Revolution such as the National Library (Nationale Bibliotheek, 1798) in The Hague and the National Art Gallery (Nationale Konst-Gallerij) for fine arts in Amsterdam. In order to ensure the colonies in the East a prominent place in Dutch society, the king also founded two new national museums and repositories for the kingdom's fast-growing ethnographic and natural historical collections: the Royal Cabinet of Rarities (Koninklijk Kabinet van Zeldzaamheden, 1816) in the Hague and the National Museum of Natural History ('s Rijks Museum van Natuurlijke Historie, 1820) in Leiden. In 1829, the king also decided to establish a National Herbarium ('s Rijks Herbarium) in Brussels, but following the violent secession of Belgium the next year, this was eventually moved to Leiden. Willem I and his advisors fostered the strong hope that these institutions would provide the cultural cement for their expansionist and aggressive economic policy at home and abroad.[3]

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[2] J. Roegiers and N.C.F. van Sas, "Revolutie in Noord en Zuid," in *Geschiedenis van de Nederlanden*, ed. J.C.H. Blom, et al. (Baarn: HB Uitgevers, 2006), 251-52; and F. Santegoets, "Het Verenigd Koninkrijk 1815-1830," in *Het ontstaan van het moderne Nederland. Staats- en natievorming tussen 1780 en* 1830, ed. W. Fritschy (Nijmegen: Sun, 1996), 225-28. For a more detailed analysis, see Van Sas, *Onze natuurlijkste bondgenoot*, chapter 3 and 4.

[3] On the museum and cultural policy of Willem I, see Effert, *Royal cabinets and auxiliary branches*, 17-26; and Legêne, *De bagage van Blomhoff en Van Breugel,* 327-97. For

The establishment of the National Museum of Natural History and the National Herbarium had a tremendous impact on the country's intellectual and cultural geography. In the years after their foundation both institutions quickly developed into nodal points for natural historical research in Europe, and by the mid-nineteenth century their collections equalled those in Paris. For many individuals interested in the study of nature the new institutions formed an ideal stepping stone for careers as a botanist, zoologist, geologist taxidermist, collector, and draftsmen. The members of the Committee for Natural History of the Netherlands Indies (Natuurkundige Commissie voor Nederlandsch-Indië) mentioned in the introduction to this study exemplify the pattern. Although many of them never returned to Europe most of their specimens, the field diaries, maps, measurements, sketches, notebooks, letters, observations and drawings that they accumulated during their stay in the region did. These materials constituted the central basis for the region's natural history as it was written in the form of lavishly illustrated monographs, travel narratives, and journal articles in the first half of the nineteenth century.[4]

By focusing on Reinwardt's early years as professor in Leiden, this chapter will show that the influx of a large number of natural historical specimens and written and pictorial notes from the Malay Archipelago and elsewhere caused tensions among directors of natural historical institutions, owners of collections and travellers who had gathered specimens abroad. Many of these individuals hoped to secure their authority and status by offering the king their services and expertise in the as yet vaguely defined field of natural history. Reinwardt's attempt to establish himself at home as an heroic traveller and virtuous administrator—an identity which he had

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separate institutional histories, see, for instance, P.W. Klein and M.A.V. Klein-Meijer, *De wereld van de Koninklijke Bibliotheek, 1798-1998. Van statelijke institutie tot culturele onderneming* (Amsterdam: Uitgeverij G.A. van Oorschot, 1998), 30-91; C.A. Kloosterhuis, *De bevolking van de vrije koloniën der maatschappij van weldadigheid* (Zutphen: Walburg Pers, 1981), chapters 1-3; Gijzen, *'s Rijksmuseum van Natuurlijke Historie*; Holthuis, *1820-1958: Rijksmuseum van Natuurlijke Historie*; P. Smit, "The Rijksherbarium and the scientific and social conditions which influenced its foundation," *Blumea* 25 (1979): 5-11; E. Bergvelt, *Pantheon der Gouden Eeuw. Van Nationale Konstgallerij tot Rijksmuseum van schilderijen (1798-1896)* (Zwolle: Uitgeverij Waanders, 1998); and, more focused, D. Meijers, "The Dutch method of developing a National Art Museum: How crucial were the French confiscations of 1795?," in *Napoleon's legacy: The rise of national museums in Europe, 1794-1830*, ed. E. Bergvelt, et al. (Berlin: Staatliche Museen zu Berlin, 2009), 41-53.

[4] For detailed references see chapter 1, footnote 4.

developed already in the Netherlands Indies—eventually failed. In particular, his claim that measuring and surveying the colonial hinterland would reveal fertile but still unexploited areas in Java fell on deaf ears in The Hague. Despite his best efforts and arguments, however, neither the king nor his ministers were willing to support Reinwardt's attempt to compile the 'physical geography' (*physikalische aardbeschrijving*) of the Malay Archipelago that was, in his opinion, a necessary prerequisite for reaching that goal.

Figure 34: Description and sketch of an Intermediate Leaf-nosed Bat (*Hipposideros larvatus)* by Heinrich Boie. The text is written in German.

In the mid-1820s, when Reinwardt tried to find sponsors for his planned publication, the king and his ministers gradually became aware that the colonies were far from being a direct source of financial reward. To the contrary, a thorough examination of the growing number of trade statistics revealed that the attempt to establish a strong and centralized administration in the Netherlands Indies had resulted in a tremendous increase of costs. Violent uprisings in Java, Sumatra, Borneo and the Moluccas further aggravated the situation. With the introduction of the cultivation system (*cultuurstelsel*) in 1830, the king and his ministers eventually opted for a system of economic exploitation that relied heavily upon local village heads who were made responsible for the production of export cash crops such as indigo, tea, sugar and coffee. Virtuous but expensive administrators such as Reinwardt, who had based their careers on compiling statistics and surveying

and improving nature and society in the field, had lost their function in Dutch society.

A New Museum of Natural History in Leiden

Reinwardt's hopes to receive assistance from the Dutch king received its first setback in the summer of 1819. While his friend Van Marum tried to delay the king's final decision on the reorganization of the museum landscape until Reinwardt's return from the Netherlands Indies, Coenraad Jacob Temminck, who, together with Van Marum, had replaced Reinwardt as interim-director of the State Cabinet of Natural History, urged the king to establish a new national museum for natural history with him as director. Temminck's trump card was a huge and unique private collection of birds and mammals, which he had inherited from his father, a former treasurer of the Dutch East India Company (VOC). According to a catalogue, Temminck's cabinet, stored in his spacious house at Herengracht 400 in Amsterdam, contained approximately 4000 prepared birds and 240 mammals.[5]

In a long letter written to Falck, minister for education, national industries and the colonies, dated July 1819, Temminck threatened to leave the country with his valuable cabinet if the king declined to establish a "magnificent monument of natural historical studies"[6] under his directorship either in Brussels or Amsterdam.

The king and his minister first hesitated, but after the sudden death of the Leiden professor for botany, natural history, medicine and chemistry Sebald Justinus Brugmans in July 1819, Temminck's wishes were at least partly fulfilled. In August 1820, the king decided to merge the State Cabinet in Amsterdam with the academic cabinet of the university in Leiden and Temminck's bird and mammal collection under the roof of a new national museum of natural history to be established in Leiden.[7] The Hof van Zessen,

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[5] C.J. Temminck, *Catalogue systématique du cabinet d'ornithologie et de la collection de quadrumanes de C.J. Temminck. Avec une courte description des oiseux non-décrits* (Amsterdam, 1807); and A.M. van Lynden-de Bruïne, *In vogelvlucht door Europa. De reisjournalen van Dionysia Catharina Temminck-Cau, 1807-1824* (Zutphen: Walburg Pers, 2001), 14.

[6] NA The Hague, collectie Falck, 85, letter Temminck to Falck, Amsterdam 17 July 1819: *". . . schitterend monument der natuurkundige studien. . . ."*

[7] For a concise history of the three natural historical collections mentioned, see Holthuis, *1820-1958. Rijksmuseum van Natuurlijke Historie*, 10-15; and most important Gijzen, *'s Rijksmuseum van Natuurlijke Historie*, 22-42.

a large building situated on the Rapenburg, one of Leiden's main canals, offered, as the king argued, a suitable venue for the new institution. Temminck also received ample financial compensation for relinquishing his collection to the state. Beside the directorship, the king granted him a lifelong pension and an annual compensation of 2000 guilders above his regular salary.[8]

Figure 35: Portrait of C.J. Temminck by Jan Adam Kruseman (1804-1862).

When Reinwardt first heard about Temminck's appointment as director of the new national museum he was quite agitated. In a letter to Van Marum, he complained that Temminck had informed him about neither the personnel changes nor about the general state of the cabinet.[9] In earlier letters to Van Marum, Reinwardt had expressed his doubts about Temminck's

[8] Holthuis*, 1820-1958. Rijksmuseum van Natuurlijke Historie*, 9-10.

[9] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Batavia, 25 March 1822: "De Heer Temminck heeft mij daaromtrent niets, en in het geheel in een paar jaren niet geschreven, en dus ook niet den verkoop zijner verzameling, en zijner aanstelling bij het Museum gemeld. Dit moet mij natuurlijk zeer bevreemden, te meer, daar anderen alhier nog onlangs brieven van hem ontvangen hebben."

merits as interim director of the State Cabinet in Amsterdam and his fear that Temminck was only interested in using his cabinet as a means to further enrich his private bird collection and to strengthen his scientific network and reputation in Europe.[10]

Reinwardt's judgment was not entirely wrong. During his years as interim director of the State Cabinet Temminck made several long journeys and met numerous collectors in Germany, France, Austria, Italy and Switzerland.[11] Moreover, he prepared two multi-volume ornithological monographs containing detailed descriptions of prepared bird specimens that he had examined in various European cabinets. Both works, the *Manuel d'ornithologie, ou tableau systématique des oiseaux qui se trouvent en Europe* (first edition 1815; second edition 1820-40) and the lavishly illustrated *Nouveau recueil de planches coloriées d'oiseaux* (1820-39) were praised among bird experts in Germany, France and Britain for their precise descriptions and the multi-volume monographs cemented Temminck's status as an outstanding ornithologist who considered the exact description and stringent classification of as many as possible specimens as the core task of every practitioner of natural history.[12]

Natural History in Dispute

Temminck's vision of how natural history should be practiced did not remain unanswered by Reinwardt, who was equally concerned about how to position himself in the kingdom's scientific landscape. In his inaugural lecture, titled "Over hetgeen het onderzoek van Indië tot uitbreiding der natuurlijke historie heeft toegebracht" (Lecture on what the research of the Netherlands Indies has contributed to the development of natural history), Reinwardt formulated and promoted an alternative vision of how natural history should be practiced in the Dutch kingdom and its colonial annex. Many of his old friends from Amsterdam and Harderwijk attended the lecture, which was held in the academy auditorium, the *Akademiegebouw,* to see him again and learn more about his stay in the Dutch East Indies.

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[10] KB The Hague, 121 B8, letter Reinwardt to De Vries, 20 May 1817 and NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, 31 October 1817.

[11] Van Lynden-de Bruïne, *In vogelvlucht door Europa,* 125-253.

[12] E. Gassó-Miracle, "The significances of Temminck's work on biogeography," *Journal of the History of Biology* 41 (2008): 710-12.

Tellingly, the director of the new National Museum of Natural History in Leiden, Temminck, was absent; he and his wife were on short trip to Paris.[13]

Reinwardt, who in the meantime had been made Knight of the Order of the Dutch Lion (Ridder van de orde van de Nederlandsche Leeuw)—one of the highest royal distinctions in the Dutch kingdom—dedicated the lecture to his former superiors Van der Capellen and Elout. In order to increase the readership of the academic lecture, which was originally given in Latin, Reinwardt's friend and colleague Matthijs Siegenbeek eventually translated the lecture into Dutch.[14] The Amsterdam publishing house Johannes van der Hey and Zoon took care that the translation of the lecture was spread among the readers in the Dutch kingdom.[15]

Reinwardt opened the lecture by introducing himself once again as the heroic traveller who had mastered the perils of travelling in the 'tropics', an area which classical authors had described as an inaccessible and scorched zone (*versengde hemelstreek*) between the tropic of Cancer and the tropic of Capricorn. Instead of following these ancient imaginations of the Malay Archipelago, Reinwardt stressed the immense fertility and extreme diversity of nature in a region that awaited further investigation and economic exploitation.[16] Neither the sun nor the unfavourable climate, nor the supposedly barbaric societies there should keep naturalists and merchants from visiting and settling in the Netherlands Indies, he argued. Individual travellers who feared the climate could protect themselves through self-discipline and moderation, and, more practically, by wearing suitable clothes, and consuming appropriate food.[17] Furthermore, the various native people were good-natured and would welcome guests as long as they did not try to change their customs and traditions.[18] But the most important reason to visit

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[13] Van Lynden-de Bruïne, *In vogelvlucht door* Europa, 258.

[14] For the Latin version, see C.G.C. Reinwardt, *Oratio de augmentis quae historiae naturali ex Indiae investigatione accesserunt* (Leiden: J. Luchtmans, 1823).

[15] C.G.C. Reinwardt, *Redevoering van C.G.C. Reinwardt over hetgeen het onderzoek van Indië tot uitbreiding der natuurlijke historie heeft toegebracht, gehouden den 3 Mei 1823* (Amsterdam: Johannes van der Hey en Zoon, 1823).

[16] Ibidem, 11.

[17] Ibidem, 17-9. For an in-depth discussion of food and clothing in the context of late eighteenth-century travel narratives, see E.C. Spary, "Self-preservation. French travels between cuisine and industrie," in *The brokered world. Go-betweens and global intelligence, 1770-1820*, ed. Simon Schaffer, et al. (Sagamore Beach, MA: Science History Publications), 355-86.

[18] Reinwardt, *Over hetgeen*, 10: "Zeker zij hadden te voren, en hebben ook thans nog hunne bewoners, en deze geenszins zoo woest, als andere volken zich dezelve gemeenlijk

the Netherlands Indies was, according to Reinwardt, nature itself. He proclaimed that any visitor from the "temperate zone" would be at first struck and overwhelmed by the incredible diversity and productivity of nature.

> First, he [the traveller in the field] is amazed at the unusual magnitude of everything; then he is so surprised by the variety and the abundance of the forms that he almost begins to despair of wanting to know all of them. Subsequently, he starts thinking about the origin of everything; about how nature can produce such abundance, based either on the earth's hard and stony elementary substances [*beginselen*], or the circulating air, or the battle and transition between those two.[19]

Subsequently, the naturalist in the field will recognize "that everything which exists in nature is nourished . . . by mutual interdependence, and that nothing, separated from the rest, can exist on its own."[20] He further added that "although the truth of this is uncontested, it is still a major shortcoming within the entire field . . . [of] natural history",[21] especially among sedentary naturalists who analyze natural specimens without having experienced and investigated the natural environment from which they come. Reinwardt warned that the underlying assumption that nature manifested itself in every specimen separately was highly problematic. Only the meticulous observation of plants, animals, and minerals *within* their local environment

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verbeelden, maar in maatschappij en tot burgerstaten verenigd, tot beschaafdheid gevormd, velen zelfs door gedenkstukken der oudheid, kunsten en vermaardheid van uitgevoerde daden beroemd, en door Godsdienstigheid uitmuntende."

[19] Ibidem, 42-43: "Eerst toch staat hij over de ongewone groottee (sic!) van alles verbaasd; daarna verwondert hij zich over de verscheidenheid en den overvloed der gedaanten, zoodat hij schier moet wanhopen van dezelve allen te leeren kennen. Vervolgens denkt hij over den oorsprong van alles na, en uit welke stoffen, en op welke wijzen de Natuur een zoo grooten overvloed van dingen werke en uitvinde, hetzij uit harde en rotsachtige beginselen der aarde, hetzij uit die der rondomstroomende lucht, hetzij uit den strijd en overgang van beide. . . ."

[20] Ibidem, 28-29: ". . . dat alles, wat in de Natuur bestaat, door . . . eene onderlinge samenwerking gevoed wordt, en dat niets, afgescheiden van het overige, geheel op zich zelve bestaat."

[21] Ibidem, 29: "Ofschoon de waarheid hiervan buiten alle bedenking is, is dit nogtans een gemeen gebrek, zich door de gansche Natuurlijke Historie verspreidende. . . ."

and the careful comparison of those observations on a global scale could lead to a new type of natural history that would help to identify and exploit the natural resources of a certain area. Such a 'new' natural history had to be based on field observations and the careful measurement and analysis of the air, water and soil.[22] Reinwardt later went so far as to claim that it must be considered a great misconception if a naturalist who wants to know more about the natural products of remote countries believes that specimens collected in the field can be properly analyzed in Europe. He was certain that those remote analyses would not at all contribute to constructing the "great building of science."[23] On the contrary, it would rather lead to ". . . a large number of superfluous names and uncertain and doubtful matters which would only cause confusion in science, and which cost others who wanted to use them fruitless efforts and precious time."[24]

To validate his point, Reinwardt referred to coral "plants" (*koraalgewassen*) which he had thoroughly investigated in the Archipelago. The naturalist, as he put it, who had not experienced and seen the corals in their environment, would think of them as rigid rocky lumps that never change their shape. Only naturalists who had observed corals in the sea water would recognize that they were created and continuously reshaped by marine animals. At the same time, Reinwardt continued, corals reveal that there is no clear boundary between earth and sea. One must even assume, as he put it, that the entire earth had apparently emerged out of the sea—a fact which sedentary naturalists would never realize.[25]

By announcing a 'new' natural history that differed wholly from the natural history as practiced by sedentary naturalists such as Temminck, Reinwardt thus offered his listeners an alternative account of the Malay Archipelago's nature. Instead of compiling descriptions of specific plants and animals, he introduced a more holistic narrative which was based on observations and measurements in the field. In Reinwardt's account, colonial nature did not remain static as it was bound to do in a museum. He rather constructed the natural scene as a dramatic play in which natural forces and elements such as volcanoes, lava streams, ash, the sea, rivers, caves, rocks and

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[22] Ibidem, 22-25.

[23] UB Leiden, BPL 2425, 20, 33-34: *". . . het groot gebouw der wetenschap. . . ."*

[24] Ibidem, 35: ". . . eene hoop van onnodige benamingen en onzekere en twijfelachtige en onbepaalde zaken, die alleen verwarring in de wetenschap brengen, en waaraan anderen die dezelve willen gebruiken, vruchteloos moeite en kostbaren tijd verspillen."

[25] Reinwardt, *Over hetgeen*, 31-33.

heavy rain staged a constant battle.[26] As Reinwardt pointed out, only a fearless travelling and measuring naturalist would be able to understand how this battle had shaped and continued to shape Java and the neighbouring islands. Such insights were not only essential to complete the natural history of the Malay Archipelago, but also to identify and exploit Java's natural wealth.[27]

Reinwardt's inaugural lecture shows again that he used a hybrid strategy to claim authority as a scientific traveller and to promote his fieldwork with the secret hope that the king would sponsor his planned publications. On the one hand, Reinwardt emphasized the economic utility of his approach, for only, as he put it, a travelling and measuring naturalist who dedicated his life to the public good was able to guarantee that the colony's natural wealth was exploited efficiently. On the other hand, he offered an attractive narrative that fitted within the king's larger aim of strengthening the cultural unity of his kingdom and its colonial annex. For in Reinwardt's account the Netherlands Indies—with Java as its crown jewel—appeared as the most fertile overseas possession of the Dutch Empire.[28]

Reinwardt's plea, however, remained unheeded. For since the late 1810s, influential individuals such as Johannes van den Bosch (1780-1844), a man with wide experience in the Indies and founder of the Society of Benevolence, warned the king and his advisors about the immense costs which the current administration of Java and the neighbouring islands would cause. In 1825, less than two years after Reinwardt's inaugural lecture, the king eventually acknowledged the urgency of the matter. In his annual speech to parliament he announced immediate and direct interventions in order to prevent a further rise of the public debts incurred by the colonies, which had almost doubled since the arrival of the General Committee in Java

[26] Ibidem, 35-38.

[27] Ibidem, 44-47.

[28] Like late eighteenth-century French travellers, Reinwardt used a combination of sensual and bodily field experiences as key features to establish his authority in Europe. For an in-depth analysis, see Spary, "Self-preservation. French travels," 355-86. For a similar analysis but with a focus on Von Humboldt, see M. Dettelbach, "The stimulations of travel: Humboldt's physiological construction of the tropics," in *Tropical Visions in an age of empire*, ed. by Felix Driver, et al. (Chicago: University of Chicago Press, 2005), 43-53.

in 1815.[29] The subsequent appointment of Johannes van den Bosch as new governor-general of the Netherlands Indies in 1828 was thus a clear sign that the king had lost his confidence in the promise that the colony could be easily transformed into a profitable annex of the Dutch kingdom.[30]

Teaching at Leiden University

The decline of Reinwardt's authority and status in the Netherlands was mirrored in his teaching activities at Leiden University. While in the aftermath of the Batavian Revolution, 'teaching' at universities had constituted an important vehicle to prove one's utility for society, in the Dutch kingdom, university teachers had been assigned to focus on the 'general education' of their students. Practical and useful subjects such as navigation, veterinary medicine and technical chemistry had to be taught at separate schools. Following the lead of the Prussian reformer Wilhelm von Humboldt (1767-1835—Alexander's older brother), it was felt that every university student should first receive a broad education before he or she started with a specialized training in a particular profession.[31] Medical students, for instance, were obliged to attend classes in mathematics, physics, botany, logic, Latin and Greek in their first year. All classes had to be taught in Latin except the courses in Dutch literature and economy.[32]

According to the public university calendar, the *series lectionum,* Reinwardt offered four or sometimes even five courses each semester.[33] The majority of his students came from well–to-do families in the provinces of

[29] For a detailed analysis, see E. Horlings, "Miracle cure for an economy in crisis? Colonial exploitation as source of growth in the Netherlands, 1815-1870," in *Colonial empires compared. Britain and the Netherlands, 1750-1850*, ed. by Bob Moore, et al. (Aldershot: Ashgate, 2003), 145-51.

[30] Van den Doel, *Het rijk van Insulinde,* 48-50.

[31] W. Otterspeer, *Groepsportret met de dame*, vol. 3, De *werken van de wetenschap. De Leidse Universiteit 1776-1876* (Amsterdam: Bert Bakker 2005), 24-26 and 223-24; and B. Theunissen, *'Nut en nog eens nut'. Wetenschapsbeelden van Nederlandse Natuuronderzoekers, 1800-1900* (Hilversum: Verloren, 2000), 13-36.

[32] H. Beukers, "Medical education in the Netherlands in the nineteenth century," in *History of medical education. Proceedings of the 6th international symposium on the comparative history of medicine——East and West,* ed. Teizo Ogawa (Tokyo: Saikon Publishing, 1983), 188.

[33] UB Leiden, AC II: Archief van Curatoren (1815-77), 216.

North and South Holland.[34] Beside chemistry (*chemia*) and pharmaceutics (*ars pharmaceutica*), Reinwardt taught medical botany *(rei herbariae fundamenta)*, natural history *(historia naturalis)* and sometimes also geology and mineralogy. Reinwardt's chemistry classes were held at the chemical laboratory in the Nonnensteeg, a little street off the Rapenburg. His classes are well documented. Beside the records of a medical student, the university library in Leiden houses several boxes of Reinwardt's preparatory notes.[35] These show that Reinwardt lectured on organic and inorganic chemistry, physiology and sometimes even on technical chemistry. Occasionally he illustrated his classes by carrying out experiments in front of his students, who would then practice some of the techniques demonstrated after the lectures.[36]

From 1826 onwards, Reinwardt was assisted by his former student Anthony van der Boon Mesch (1804-74), an apothecary from Delft. On behalf of Reinwardt, the trustees appointed him as lecturer for chemistry in Leiden. Under Reinwardt's supervision, Van der Boon Mesch had written a thesis on the geology of Java's volcanoes based on Reinwardt's own geological observations and measurements on the island.[37] While Reinwardt taught at the university laboratory, Van der Boon Mesch held his classes in the laboratory of the Industry School (*industriecollege*) at the Aalmarkt in Leiden. The school had been established in 1825 on behalf of Willem I in order to improve the chemical, mathematical, and physical expertise of craftsmen, apothecaries and textile manufacturers in Leiden. Similar schools were established in Groningen, Utrecht, Liège, Leuven and Gent.[38]

Reinwardt's botanical courses were split into two parts. In the more theoretical course (*rei herbarium fundamenta*) he lectured about plant physiology—that is, the anatomy of plants—, plant geography, and the

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[34] Otterspeer, *Groepsportret met de dame,* 177.

[35] For the student notes, see UB Leiden, BPL 1280, Collegedictaat: Dictata in chemiam (1823-24). For Reinwardt's preparatory notes, see BPL 599: Lectiones chemicae; BPL 600: Lectiones de chemia organica et anorganica; BPL 601: Lectiones et adnotationes de chemia animalia et physiologia; BPL 602: Lectiones et adnotationes de chemia technica; and BPL 610: Adnotationes de experimentis suis chemicis

[36] UB Leiden, AC II: Archief van Curatoren (1815-1877), 270-3 (I), Annual report by Reinwardt, 1837.

[37] A.H. van der Boon Mesch, *Disputatio geologica de incendiis montium igni ardentium insulae Javae, eorumdemque lapidibus* (Lugduni Batavorum: Haak et Socios, 1826).

[38] On the establishment of industry schools in Leiden and elsewhere in the Netherlands, see N.B. Goudswaard, *Vijfenzestig jaren nijverheidsonderwijs* (Assen: Van Gorcum, 1981), 33-45, 133-8.

different taxonomic systems according to which plants were named and classified.[39] Reinwardt's second class (*historia plantarum*) was held in the *hortus*. In this class, which was only taught in spring and autumn, Reinwardt showed his students how to identify and harvest medicinal and other plants. The practical botanical classes in the *hortus* were open not only to medical students. In 1825, the local apothecaries' association, the Concordia, asked Reinwardt to teach extra classes for their apprentices. From 1826 onwards, these classes were given by his colleague Jan van der Hoeven (1801-68), who had been appointed as extraordinary professor of natural history in the same year.[40] Van der Hoeven, who came from a rich family of Rotterdam merchants, taught classes on natural history, anthropology, comparative anatomy and osteology, geology, mineralogy, zoology and pharmaceutics. Owing to his former position as 'honorary custodian' of the National Museum in Leiden, Temminck allowed Van der Hoeven to use the museum collection for educative and other academic purposes.[41]

In his function as professor for botany and natural history, Reinwardt was also responsible for the university's botanical garden. Until his return from the Netherlands Indies in late 1822, the directorate had been held temporarily by the medical professor Gerard Sandifort (1779-1848). Sandifort had managed to convince the trustees of the university to build two new hot houses in which plants, shrubs and trees from the Cape, South America, Australia, and Asia could be cultivated. According to a catalogue compiled by Sandifort, the garden included more than 5000 plant species as of early 1821.[42] Under Reinwardt's direction, the garden again witnessed several infrastructural changes. Similar to Sandifort, Reinwardt initiated the establishment of new hot houses and a new heating system for the cultivation of orchids, palm trees and other exotic plants during the winter months.[43]

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[39] See the records of one of his students in UB Leiden, BPL 1497: *Dictata in rem herbariam.* His own preparatory notes can be found in UB Leiden, BPL 594 I-III: *Lectiones botanicae accedunt permultae adnotationes.*

[40] Bierman, *Van artsenijmengkunde naar artsenijbereidkunde,* 221-22.

[41] C.J. van der Klaauw, *Het hooger onderwijs in de zoölogie en zijne hulpmiddelen te Leiden* (Leiden: A.W. Sijthoff's Uitgeversmaatschappij, 1926), 11.

[42] On Sandifort's interim directorate, see T.W. van Heiningen, *Gerard Sandifort (1779-1848) in twee werelden* (Utrecht: Drukkerij Elinkwijk BV, 1995), 32-33; and W.K.H. Karstens and H. Kleibrink, *De Leidse Hortus. Een botanische erfenis* (Zwolle: Uitgeverij Waanders, 1982), 57-58.

[43] Karstens and Kleibrink, *De Leidse Hortus,* 62-65; and E.M. Terwen-Dionisius, "Vier eeuwen bouwen in de hortus, deel II," *Leids Jaarboekje* 73 (1981): 71-75.

Besides shipments from the botanical garden in Buitenzorg, Reinwardt regularly exchanged living plants and seeds with botanical gardens in Bonn, Greifswald, Münster, Göttingen, Munich, Gent, the Cape, Hamburg, Liège, Surinam, Paris, and London.[44] Another supplier of seeds and living plants and herbs was the German physician Philipp Franz Balthasar von Siebold, who had established a botanical garden close to the Dutch factory on Deshima in Japan.[45] A catalogue of the Leiden *hortus* compiled in 1831 lists several plants gathered by Von Siebold and his numerous Japanese helpers around Nagasaki Bay between 1824 and 1828.[46]

Since under Willem I academic professors were forced to offer general courses in their respective fields, Reinwardt was not able to use his teaching as a vehicle to promote his particular vision of nature. Reinwardt, who was used to teaching practical courses, had to spend much of his energy and money catching up with the latest developments in botany, natural history, geology and chemistry. In this new academic climate, his seven years in the Indies now turned out to be heavy burden.

Another Setback

Between teaching and administering the botanical garden, Reinwardt tried to find time to prepare his travel account and a substantial publication on Java's flora, with the working title *Flora Javanicorum*. In 1825, the trustees of the university allowed him to employ as his assistant the Groningen apothecary Pieter Willem Korthals for one year.[47] But Reinwardt was not the only one working on a monograph of Java's flora. Also in 1825, Reinwardt's former assistant Carl Ludwig Blume returned to the Netherlands with a huge collection of botanical and zoological specimens, notes and illustrations. During the first months of his stay, Blume even lived in Reinwardt's house in

[44] For a good overview of the institutions and people with which Reinwardt exchanged seeds, see Van Heiningen, *The correspondence of Caspar Georg Carl Reinwardt,* 461-727.
[45] For Siebold's botanical field work in Japan, see T. Yamaguchi, *Von Siebold and Japanese botany* (Kumamoto: Aitsu Marine Biological Station, Kumamoto University, 1997), 1-45.
[46] H. Veendorp and L.G.M. Baas Becking, *Hortus Academicus Lugduno-Batavus, 1587-1937* (1938; repr.. Leiden: Rijksherbarium, 1990), 153-57.
[47] Karstens and Kleibring. *De Leidse Hortus. Een botanische erfenis* (Zwolle: Uitgeverij Waanders, 1982), 61-2.

the Nonnensteeg. His collection was temporarily stored in the orangery of the hortus.[48]

A few months after his return to Leiden, the Dutch government approached Blume about whether he would be willing to sell his botanical and zoological collection to the king. Temminck, who had also heard about the rich diversity of Blume's collection, had already handed in an official request to merge the collection with the specimens of the National Museum of Natural History in the nearby Hof van Zessen. Blume's reaction to the king's request was positive. Like Temminck a couple of years earlier, he offered his botanical and zoological collection to the king, but with several preconditions: apart from a financial compensation, he claimed the directorship of a new institution for botanical research as well as financial and political support for the publication of an illustrated *Flora Javae* which should, Blume suggested, comprise around 400 pages of text and 1600 partly coloured lithographs, 200 of them in folio format. Blume asked the government for a sum of 50.000 guilders spread out over several years.[49] He strengthened his claim by noting that Reinwardt's teaching and other obligations allowed the latter hardly any time to work on his *Flora*.[50]

Unlike Reinwardt's appeal, Blume's request did not go unnoticed in The Hague. After the Ministry of the Interior sought the advice of Temminck, the king decided to buy Blume's rich collection of dried animals skins, skeletons, minerals and fossils. Blume received a stipend of 5000 Dutch guilders, 2000 guilders for his collection of insects, dried animals skins, skeletons, and minerals, and 3000 guilders for his services as health officer in the Netherlands Indies. The collection, which was packed in sixty-two boxes, was handed over to Temminck in August 1828. Temminck was more than pleased with the quantity and good state of preservation of the items.[51]

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[48] For a detailed and thorough study of Blume's activities in Leiden see the excellent MA thesis of A. den Ouden which is stored in the library of the National Herbarium Leiden: A. den Ouden, "C.L. Blume, periode 1826-1832" (Master's thesis, Leiden University, 1979).

[49] Blume expected the entire publication would cost 163.500 guilders. For his calculations, made up in Leiden in March 1827, see NA The Hague, Ministerie van Binnenlandse zaken, 1813-1870, inv. 2778, Royal decision, 23 July 1827, no. 152.

[50] Den Ouden, "C.L. Blume, periode 1826-1832," 16-37.

[51] Ibidem, 21-32.

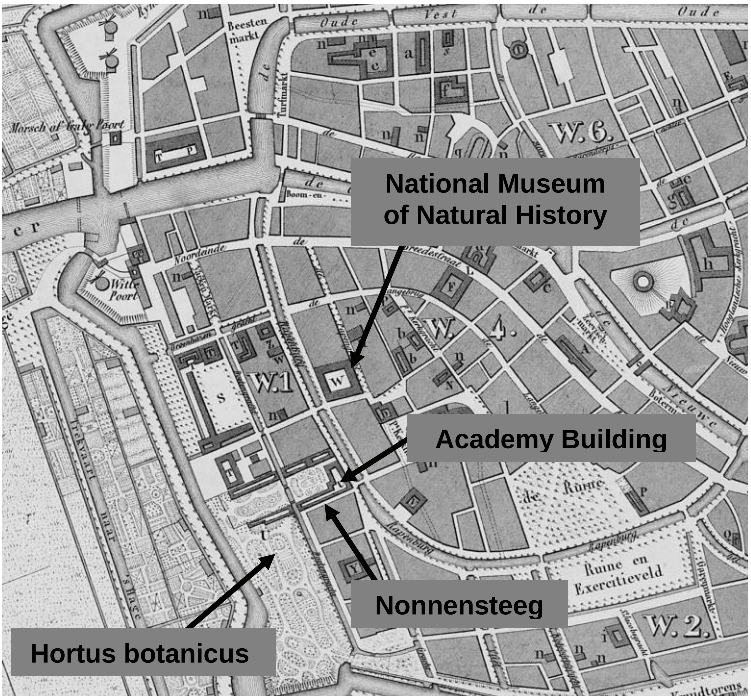

Figure 36: Section of a map of the Leiden city centre (1832).

Blume's second precondition, the publication of a *Flora Javae* was only realized after a series of lengthy negotiations.[52] When Blume sent his plans to the Ministry of the Interior, the king initially approved them on the condition that Blume would further discuss his proposal with Reinwardt and Jacobus Gijsbertus Samuël van Breda (1788-1867), professor of botany, zoology and comparative anatomy in Gent, in order to prevent double descriptions of the same plants. Van Breda was preparing a monograph on Javanese orchids and *asclepiadae* (milkweed) based on field notes, specimens and illustrations by Johan Conrad van Hasselt and Heinrich Kuhl, members of the Committee for Natural History of the Netherlands Indies, who had passed away shortly after their arrival in Java.[53]

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[52] Ibidem, 33-46.

[53] P. Smit and Th. J.J. Kooien, "J.G.S. van Breda als botanicus, in het bijzonder zijn aandeel in de publicatie van de 'Genera et Species Orchidearum et Asclepiadearum quas in itinere per insulam Java…,' in *Leven en werken van J.G.S. van Breda (1788-1867)*, ed. A.S.H. Breure, et al. (Haarlem: Hollandsche Maatschappij der Wetenschappen, 1979), 147-56; and Klaver, *Inseperable friends*.

Figure 37: Portrait of Carl L. Blume published in the third volume of the *Rumphia, sive commentationes botanicae*, published in 1847.

In the end, Reinwardt and Van Breda were confronted with a *fait accompli*. In July 1827, the king decreed that Temminck and Blume should start working on a joint publication on the natural history of the Netherlands Indies. Temminck was asked to write the volume on zoology and Blume the volume on botany. To finance the costly undertaking, the king granted Blume and Temminck 7000 Dutch guilders each, while Reinwardt was asked to hand over his private herbarium, illustrations and all the notes which he had compiled in the Netherlands Indies.[54]

Reinwardt agreed grudgingly. In December 1827, he promised Daniël Jacob van Ewijk—the responsible civil servant at the ministry of the interior in The Hague—to deliver his botanical and zoological notes to Blume and Temminck. But at the same time he complained that the new

[54] NA The Hague, Ministerie van Binnenlandse zaken, 1813-1870, inv. 2778, Royal decision, 23 July 1827, 152.

project would make much of his preparatory work for a travel account and *Flora Javanicorum* useless. Reinwardt was of course irritated about Blume's claim to be the only expert of Java's flora. Some of the discoveries Blume mentioned in his *Bijdragen tot de Flora van Nederlandsch Indië* (Contributions to the flora of the Netherlands Indies) were, according to Reinwardt, based on his own observations and notes which he had shared with Blume in the Netherlands Indies and which Blume had used without informing or asking him.[55] In the same letter, Reinwardt voiced similar concerns about the zoological notes and specimens which he had to hand over to Temminck. Reinwardt explained to Van Ewijk that despite his wide-ranging teaching and administrative duties he had already started to prepare his own publication on the flora and fauna of the Netherlands Indies. Beside the acquisition of expensive books which were not available in the library of the university, he had already prepared and arranged for a certain number of plant drawings.[56]

The Foundation of a National Herbarium

Blume's third precondition was fulfilled in the spring of 1829. After months of negotiations during which Blume threatened to leave the country with his collection, the king agreed on establishing a national herbarium with Blume as its head.[57] Blume should receive an annual salary of 3000 guilders and was even decorated with an extraordinary professoriate without teaching obligations. Since the mayor of Brussels had agreed to provide a suitable venue, the new botanical institution (*'s Rijks Herbarium*) was to be established in the southern part of the Netherlands. The new institute was based on the herbaria of Blume, Reinwardt, Kuhl and Van Hasselt, Von

[55] Ibidem, inv. 4379, letter Reinwardt to Van Ewijk, Leiden, 3 December 1827 and ibidem, letter Reinwardt to Ewijk, Leiden 12 December 1827, in which he wrote: "Van de daartoe gunstige gelegenheid gebruik makende, heeft hij met de uitgave zijner Bijdragen tot de Flora van Nederl.[andsch] Indie een algemeen beschrijving van de bekend gewordene gewassen van die gewesten gegeven, en daartoe zonder mijne voorkennis, van het door mij aan hem medegedeelde gebruik gemaakt, zelfs van mijne waarnemingen en verzamelingen, gedaan op plaatsen die hij zelf niet bezocht heeft, en zulks zonder vermelding van het door mij verrigtte of aan hem door mij medegedeelde, en derhalven klaarblijkelijk met het oogmerk om eene bekendmaking door mij zelve van mijne nasporingen te doen voor te komen, dezelve nutteloos te maken. . . ."

[56] Ibidem, inv. 4379, letter Reinwardt to Van Ewijk, Leiden, 3 December 1827.

[57] For a concise overview, see Den Ouden, "C.L. Blume, periode 1826-1832," 63-72.

Siebold and a collection of South African plants collected by Christiaan Hendrik Persoon.[58] The different herbaria remained in Brussels for only a couple of years. Owing to the political tensions in the summer of 1830, which eventually led to the establishment of the independent kingdom of Belgium, the entire collection returned to Leiden in the same year. Since Brussels was no longer part of the Dutch kingdom, Willem I finally moved the seat of the Herbarium from Brussels to Leiden, where around fifty boxes were temporarily stored in the orangery of the hortus.[59]

In order to create a solid foundation for the new institution in Leiden, the king decided to merge the herbarium of the hortus with the plant collection of the National Herbarium, with the new institution being accommodated in the rooms of the *hortus botanicus* in Leiden. The instructions for the new institution were not settled before February 1832. While Reinwardt claimed free and unlimited access to the collection for himself and his students, Blume advocated a more restrictive policy. Blume regarded the National Herbarium as a separate institution with no direct links with the university. In Blume's view, academic teachers such as Reinwardt should be granted only very limited access to the collection, in order to guarantee the exclusivity of the institution and its publications. In the end, Van Ewijk followed Blume's advice. According to article four of the instructions, Reinwardt and other specialists were granted access to the collection only with Blume's consent. Borrowing specimens for educational and other purposes also depended exclusively on Blume´s good will.[60] To ensure adherence to this restrictive policy, Blume moved the plant collection of the National Herbarium to his house at the Rapenburg in 1834. Later the National Herbarium got accommodated on the ground floor of the National Museum of Natural History in the same street. The Royal Museum for Antiquities (Rijksmuseum van Oudheden) was housed in the same building.[61]

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[58] Van Steenis-Kruseman, "The collections of the Rijksherbarium," 30-31 and Den Ouden, "C.L. Blume, periode 1826-1832," 66-67.

[59] Smit, "The Rijksherbarium," 5-11.

[60] For a detailed history of the genesis of the instruction, see Den Ouden, "C.L. Blume, periode 1826-1832," 78-85.

[61] Van Steenis-Kruseman, "The collections of the Rijksherbarium," 31.

Traces of an Alternative Account

Owing to Blume's wide-ranging-claims and publications—the first instalments of his *Flora Javae* came off the press in the winter of 1828—Reinwardt's plans to prepare a *Flora Javanicorum* turned out to be unrealistic. Owing to the lack of alternatives, Reinwardt thus focused his attention on transforming his field notes and excerpts into a coherent narrative with a strong focus on the geological features of Java and neighbouring islands. In this he was also unsuccessful, and the remnants of his efforts are now housed in the special collection of Leiden University's library.

In his unfinished manuscript, Reinwardt placed himself in the tradition of the Scottish farmer and entrepreneur James Hutton (1726-1797), author of a monograph entitled *Theory of the Earth with Proofs and Illustrations*, published in Edinburgh in 1795.[62] In contradiction to 'neptunists' who believed that basalt and other rock formations had been shaped in a primordial ocean, 'vulcanists' such as Hutton argued that a strong and extremely hot source in the interior of the earth had shaped its crust and underlying strata.[63] The debates between 'vulcanists' and 'neptunists' peaked in the 1790s and eventually sparked a whole series of geological field inquiries in Europe and elsewhere.[64] While previously mineralogists had often delegated the actual collection of specimens to their assistants, many now emphasized the importance of analyzing rocks in their natural environment. They were particularly attentive to the spatial relationship between different rock types and the observation of geological phenomena such as the eruption of volcanoes or earthquakes.[65] With his account, Reinwardt hoped to fill the gap for the Malay Archipelago, the geology of which had up to that moment only been superficially studied. Already in the Netherlands Indies, he had started to speculate about how an extremely hot force 'from below' had shaped the far-flung Malay Archipelago. In a letter from the Banda Islands to Van Marum he put it as follows: "After

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[62] For a brief biography of Hutton and contextualization of Hutton's work, see Oldroyd, *Thinking about the earth,* 92-97; and M.T. Greene, *Geology in the nineteenth century. Changing views of a changing world* (Ithaca: Cornell University Press, 1982), chapter 1.

[63] M.J.S. Rudwick, "Minerals, strata, fossils," in *Cultures of Natural History*, ed. N. Jardine et al. (Cambridge: Cambridge University Press, 1996), 266-71. For an analysis from a Dutch perspective, see E. den Tex, "Was basalt derived from water or from fire? Dutch contributions to an 18th-Century Controversy," in *Dutch pioneers of the earth sciences*, ed. by Jacques L.R. Touret, et al. (Amsterdam: KNAW, 2004), 33-41.

[64] Oldroyd, *Thinking about the earth,* 71-85.

[65] Rudwick, *Bursting the limits of time,* 41-44, 71-84.

all what I have seen here in the East Indian Islands, I had to say goodbye to the Wernerian system; *Hutton* is my man, and everything which one observes here, is a nice comment on his theory."[66]

Reinwardt's unfinished manuscript—200 handwritten pages—consists of two large sections. In the first part, he guides his readers to the Netherlands Indies by revising the entries of his field diary made during the sea passage to the Dutch colony. In the second part, Reinwardt changed the narrative mode and developed—as had Hutton—a more holistic vision of the historical development of the Malay Archipelago's environment.[67]

Reinwardt opened the second part of his account by reviewing the different forces of nature such as water, wind and fire, which according to him, had shaped and continued to shape nature in the far-flung island world of the Malay Archipelago. The fact that the Malay Archipelago was encircled by a natural wall of coral reefs, small islands, narrow sea lanes and submarine rock formations had a tremendous impact on the region's geology and nature. While the water in the deep sea of the Indian Ocean and the Pacific could move freely without any natural impediments, the sea within the Malay Archipelago formed a segregated area.[68] Since the mud in the water could not traverse the natural barrier around the Malay Archipelago, the material would be deposited on the shores or between different islands. This resulted in two distinct kinds of coastlines. While the coast towards the interior of the Archipelago was characterized by broad and flat alluvial banks, those facing the Indian Ocean and the Pacific featured high and steep rocks, or coral reefs that protected the region from the sea.[69]

Reinwardt saw his thesis confirmed by similar observations made by others along the coastline of mainland Southeast Asia. Not only along the east side of the Malay Peninsula, but also at the mouth of the Mekong delta and in the South China Sea one could recognize alluvial mud banks which would raise and enlarge the existent land and block rivers from flowing directly from the hinterland to the sea. Once the sand and mud banks had

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[66] NHA Haarlem, 529: Archive Martinus van Marum, letter Reinwardt to Van Marum, Banda, 23 May 1821: "Na al het geen ik nu hier reeds op de O.I. eilanden gezien heb, heb ik het Wernersche system geheel vaarwel moeten zeggen; Hutton is nu mijn man, en al wat men hier ziet, is een schoone Commentarius op zijn stelsel."

[67] For an in-depth analysis of contemporary voices who stressed the importance of a 'geohistory', see M.J.S. Rudwick, *Worlds before Adam. The Reconstruction of Geohistory in the Age of Reform* (Chicago: Chicago University Press, 2008).

[68] UB Leiden, BPL 2425, 20, 133.

[69] Ibidem, 134.

risen above sea level, fast-growing sea plants covered the area and stabilized it with their roots and trunks. [70] Rivers which brought mud from the hinterland of mainland Southeast Asia to the coasts—rivers like the Menam in Siam, the Mekong in Cambodia, the Red River (Reinwardt calls the river Sangkoi) in the province Tonkin in northern Vietnam) and the Yellow River even increased the velocity and intensity of this process.[71] Within the Malay Archipelago the situation was even more dramatic. Beside the mud carried by the rivers from mainland Southeast Asia to the archipelago, the islands would witness a whole array of natural forces such as fast-running water, heavy rain, erosion, and volcanic activity which continuously changed the physical appearance and environment of the area.[72]

In the last part of his unfinished manuscript, Reinwardt warned his readers that his account was only a first attempt to shed light on the working of the various natural forces in the Archipelago. Many more field measurements and observations would be necessary for a general 'physical' description of the Malay Archipelago. Such a description had to be based on a detailed analysis of the cyclical and divine interplay between soil, plants, volcanic activity, rain and wind on the different islands.

Reinwardt presented parts of his geological account of the Malay Archipelago in the form of lectures in front of the members of the First Class of the Royal Institute of Sciences in Amsterdam[73] and at a gathering of the Gathering of German Naturalists and Physicians (Versammlung deutscher Naturforscher und Ärzte) organized by Alexander von Humboldt in Berlin in late 1828. The latter reacted more than enthusiastically to Reinwardt's elaborations and immediately initiated the publication of his lecture as a monograph. The Berlin Academy of Sciences (Berliner Akademie der Wissenschaften) published the lecture under the German title *Über den Charakter der Vegetation auf den Inseln des Indischen Archipels* (On the character of the vegetation on the islands of the Indian Archipelago).[74]

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[70] Ibidem, 137-41.

[71] Ibidem, 148: ". . . zij brengen het harde, logge, doode, en van de bewoonde wereld afgescheiden gedeelte der aarde wederom tot den kring van beweging, werking en leven terug."

[72] Ibidem, 154.

[73] A reprint of this lecture can be found in De Vriese, *Reinwardt's reis*, 101-18.

[74] C.G.C. Reinwardt, *Über den Charakter der Vegetation auf den Inseln des Indischen Archipels: Vortrag, gehalten in der Versammlung deutscher Naturforscher und Ärzte in Berlin am 20. Sept. 1828* (Berlin: Königliche Akademie der Wissenschaften, 1828). Von Humboldt's enthusiasm is recounted in W.H. de Vriese, *Ons streven naar den waren roem.*

Collecting in the Netherlands Indies

While Reinwardt struggled to find the time and the political and financial support to finish his 'physical description' of the Malay Archipelago, the neighbouring National Museum of Natural History in the Hof van Zessen witnessed the arrival of a large number of specimens, notes and illustrations from the Netherlands Indies which members of the Committee for Natural History of the Netherlands Indies had amassed on expeditions to West-Java, Makassar, Ambon, Celebes, New Guinea, Timor and Sumatra in the 1820s and 1830s. The Committee had been established in 1820 at Temminck's behest and with the financial support of the king. Reinwardt was hardly involved in the organization of the Committee. It was in particular Temminck—with the consent of the king—who chose the travellers and issued detailed instructions about how the colony's natural wealth and diversity should be investigated. According to a report by Wilhelm de Haan (1801-55), since 1825 curator for the collection of invertebrates at the *Rijksmuseum*, the number of insects had risen from 249 to 18.410 in 1834.[75] These specimens not only served as the basis for publications, but were also traded for other specimens held by natural historical museums in Europe such as the Fridericianum in Kassel, the Senckenberg Museum in Frankfurt, the Muséum national d'Histoire naturelle in Paris and the British Museum in London.[76]

Despite the large number of collectors in the Netherlands Indies the preparation of publications proceeded only slowly at first. In the early 1830s only a few articles and excerpts of letters had come off the press.[77] Some of the collected items had even been sent to the Muséum in Paris to speed up their description and publication. The collected fishes of Kuhl and Van Hasselt were for instance described by Georges Cuvier and Achille Valenciennes (1794-1865) in their *Histoire naturelle des poissons* (1828-1849).[78]

Eenige woorden van dankbare herinnering bij het afsterven van den hoogleraar C.G.C. Reinwardt (Leyden: C.C. van der Hoek, 1854), 12-13.

[75] Gijzen, *'s Rijksmuseum van Natuurlijke Historie*, 44.

[76] Holthuis, *1820-1958. Rijksmuseum van natuurlijke historie,* 20-21; R. Visser, "Het rijksmuseum van natuurlijke historie in de 19de eeuw," in *Het verdwenen museum. Natuurhistorische verzamelingen, 1750-1850* (Blaricum: V+K Publishing, 2002), 175-86.

[77] See for instance: W. de Haan, "Uittreksels uit de berigten van de heeren Boie en Macklot, geschreven aan boord van de Dijkzigt, gedurende hunne reis naar Java," *Bijdragen tot de natuurkundige wetenschappen* 2 (1827): 480-89.

[78] Klaver, *Inseparable friends,* 2.

Figure 38: Specimen of a Vogelkop Tree-kangaroo (*Dendrolagus ursinus)*. collected in New Guinea in 1828 now stored in the depot of NCB Naturalis in Leiden.

Owing to the rather slow publication of the results, it is not surprising that voices started to question the usefulness of the rather costly collecting enterprise. In a long letter to the Minister of the Interior in The Hague written in early 1836, Jean Chrétien Baud (1789-1859), since 1833 interim governor-general of the Netherlands Indies, complained about the inefficiency of the Committee for Natural History. Hardly any of the travellers, as he put it, had managed to publish their results and informed the general public in the Netherlands about the wealth of the colony. The majority of the material remained in the possession of some of the committee members or, in some cases, had already been published by foreign naturalists. The Netherlands had thus missed the honour of a large number of discoveries made at considerable expense to the colonial government in Batavia. In order to cut the annual cost of 40.000 guilders, Baud proposed that the minister restrict the naturalists spent collecting in the colony and that he send them back to the Netherlands to publish their findings as quickly as possible.[79]

[79] NA The Hague. Binnenlandse zaken. Archief van het ministerie van Binnenlandse Zaken, inv. 4652, verbaal: 5 September 1837. Extract uit het register der resolutien van den Gouverneur Generaal ad-interim van Nederlandsch Indië in rade. Buitenzorg, 27 February 1836.

Baud's complaints did not go unanswered. Since the king and his minister felt uncertain how to answer the governor-general's request, they asked Temminck and Reinwardt for further advice. While Temminck complained mostly about the lack of financial support by the king and the unreliability of his collectors to report about their field work in an appropriate manner, [80] Reinwardt told the king that Temminck and his helpers had, as Reinwardt put it, spent years sorting, describing, classifying and naming an incredible number of new specimens. While voicing his support for these activities by emphasizing that they were a prerequisite for a worthwhile publication of the findings, however, Reinwardt again claimed that natural historians had to move beyond merely descriptive activities. Moreover, Reinwardt condemned all attempts to consider the discipline of natural history as an exclusively nationalist endeavour. In his view, all observations made and specimens accumulated in the Dutch colonies should belong to a shared pool accessible to naturalists all over Europe for their investigations.[81]

Reinwardt's appeal to practice a transnational natural history received little attention in The Hague at first. In the years after the Java-War (1825-30) and the violent secession of Belgium in 1830, especially, the king and his ministers sought to cut the costs associated with the colonial project in the Malay Archipelago, which had risen to forty million guilders per year. As explained in chapter five, the king had followed Johannes van den Bosch's advice to introduce a more conservative exploitation system (*cultuurstelsel*) in Java. Instead of stimulating free trade and 'liberating' Javanese peasants from so-called forced deliveries as the General Committee and Van der Capellen had done, Van den Bosch forced villages (*desa*) to use one fifth of their land for the cultivation of cash crops such as indigo, sugar and coffee. To compensate Javanese farmers for their agricultural services, the colonial

[80] Unfortunately. I was not able to find Temminck's full answer in the archives of the Ministry of the Interior despite an in-depth research. Large parts of it are reprinted in Veth, *Overzicht van hetgeen,* 84-87.

[81] Ibidem, "Het gebruik van alle die wetenschappelijke hulpmiddelen tot Nederland en Nederlanders te willen bepalen, en als tot een monopolie te maken, zoude voorzeker, en te regt, als eene met den geest en het nuttig doel dier instellingen strijdige bekrompenheid gelaakt worden, terwijl eene geheel vrije en uitgebreide vergunning niet missen kan bij alle beschaafde volken aan Nederland alleen de eer en den roem, deze bronnen van kennis het eerst geopend te hebben, te doen toekomen."

government granted them a small salary which was, of course, far below the price of these mentioned products on the world market.[82]

Figure 39: A loose compilation of Kuhl's zoological field notes now stored in the archives of NCB Naturalis.

Probably owing to the enormous economic success of the cultivation system in the 1830s, the king eventually invited Reinwardt, Blume and Temminck to develop a plan for a larger publication on the natural history of the Netherlands Indies.[83] However, when the king and his ministers heard about the costs of the new multi-volume project, they asked the three naturalists to cut expenses by lowering the salaries of the active members of the Committee for Natural History and scrapping a volume on ethnography, geography and geology. In their reply, Reinwardt, Blume and Temminck defended the project by reminding the king that it would be a rather awkward situation if the only available monographs dealing with Java and the neighbouring islands were Raffles's *History of Java* (1817) and Crawfurd's *History of the Indian Archipelago* (1820), both published in English. The last major Dutch volume on the Malay Archipelago to come off the press was François Valentijn's *Oud- en nieuw Oost Indiën* (1724-26) a century earlier. According to the three naturalists, the reasons for the lack of Dutch engagement with such projects were wide-ranging. Neither the king, nor booksellers would currently dare to finance such costly endeavours. Moreover,

[82] Van den Doel, *Het rijk van Insulinde,* 48-58.

[83] On the economic success of the cultivation system see for instance: Horlings, "Miracle cure for an economy," 153-57.

it would be difficult to find well-trained draftsmen, engravers and lithographers in the Netherlands who had the skills to produce accurate plates of landscapes, people, animals and plants.[84]

Apparently their complaints struck a chord. In February 1839, one year before his abdication, the king eventually agreed to sponsor a multi-volume book project with the working title *Verhandelingen der Nederlandsche Natuurkundigen betreffende de voortbrengselen en gesteldheid der Nederlandsche Overzeesche bezittingen* (Proceedings of Dutch naturalists regarding the products and present state of the Dutch overseas possessions). The volumes were supposed to comprise field reports, observations, and illustrations produced by members of the Committee for Natural History and scientific descriptions of specimens that had been collected in the Netherlands Indies and were stored in the National Museum of Natural History and the National Herbarium in Leiden. The king even invited Temminck to include material from other Dutch travellers and administrators who had investigated and visited the Netherlands Indies. However, all contributions had to be written either in Dutch or Latin. In order to maintain the 'national flavour' of the monographs, French—the leading language for natural historical publications at that time—was ruled out. The publication project was also well-funded. The king allowed Temminck, Blume, Reinwardt and Jan van der Hoeven a sum of 36.000 guilders to be spent within a period of three years from 1839 onwards.[85]

Officially the project was steered by Temminck, director of the Museum of Natural History in Leiden. Reinwardt, Blume and Van der Hoeven were supposed to support and assist Temminck and his staff at the museum to screen, arrange and describe the abundantly available raw material. In a long letter to the king which preceded the king's decision, the Minister of the Interior Hendrik Merkus de Kock (1779-1845), explained and reflected upon Temminck's leading role in the steering committee. According to De Kock, Temminck had a proven record of splendid natural historical publications and he had developed the museum into an institution recognized across Europe. Reinwardt and Blume scored much lower in his esteem. While Reinwardt had published hardly anything about his stay in the

[84] NA The Hague, Ministerie van Binnenlandse Zaken, inv. 4670, verbaal: 12 October 1838. Rapport aan zijne excellentie den Heere Minister van Binnenlandsche zaken door de ondergetekende Gecommitteerden in de zaak der natuurkundige commissie op Java. Leiden, 9 October 1838.

[85] NA The Hague, Algemene Staatssecretarie en Kabinet des Konings, inv. 4450, royal decision, 10 February 1839, no. 101.

Indies, Blume's complex personality would make it difficult to finish the project within a fixed period. Nonetheless, in order to prevent tensions, Reinwardt, Blume and Van der Hoeven had to be involved in the publication project as regular members of the steering committee.[86]

The *Proceedings*, which came off the press between 1839 and 1847, comprised in total three volumes delivered in twenty-nine instalments.[87] While the first volume dealt with zoology, the second and third volume focused on botany and ethnography. Each volume was printed in large folio format and included articles and descriptions by the members of the Committee for Natural History and the staff of the National Museum of Natural History in Leiden. The articles in the volume on zoology were mainly written by Salomon Müller, who had returned from the Indies in 1837, Hermann Schlegel (1804-84), curator for vertebrates, and Wilhem de Haan, curator for invertebrates at the National Museum. Their articles discussed and described a large number of mammals, fishes, reptiles, birds and insects that had been collected and observed in the Malay Archipelago. The volume on botany contained eleven papers by Pieter Willem Korthals, who had endowed the National Herbarium with a large number of new plant specimens. In his articles, Korthals gave detailed descriptions of different plant genera, such as the carnivorous *Nephentes* or evergreen trees and shrubs (*Nauclea*). The third and last volume of the Proceedings on ethnography (*Land- en Volkenkunde*) contained reports of expeditions to Ambon, New Guinea, the Banda Islands, Timor, and Borneo. The written travel accounts were accompanied by eighty-six lithographs showing various maps, landscape views, volcanoes, local inhabitants, ethnographical objects such as baskets and weapons, and views on the scattered Dutch settlements in the Malay Archipelago.[88]

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[86] Ibidem. Attached to the royal decision is a letter of the Minister of the Interior to the king, dated 24 January 1839.

[87] For exact publication dates of the individual installments, see A.M. Husson and L.B. Holthuis, "The dates of publication of "Verhandelingen over de Natuurlijke Geschiedenis der Nederlandsche Overzeesche bezittingen," *Zoologische mededeelingen* 34:2 (1955): 17-24.

[88] For an in-depth discussion of the illustrations of all volumes, see J. Bastin and B. Brommer, *Nineteenth century prints and illustrated books of Indonesia with particular reference to the print collection of the Tropenmuseum, Amsterdam. A descriptive bibliography* (Antwerpen: Het Spectrum, 1979), 15-8.

Figure 40: Lithograph of a herald in Amarassie (Timor) in the ethnography volume of the *Verhandelingen over de Natuurlijke Geschiedenis der Nederlandsche Overzeesche Bezittingen* (1839-44).

Financially, the sumptuously produced Proceedings were only a modest success. A substantial number of copies—only 250 came off the press—were ordered by the Dutch government and spread among ministries, learned societies and natural historical museums in the Netherlands and abroad. In 1846, the Academy of Natural Sciences in Philadelphia noted the arrival of several instalments of the Proceedings in their library.[89] Apparently the monographs also served as a diplomatic gift. A catalogue of the State Library in New York reveals that the Dutch consul donated a copy on behalf of the Dutch king.[90] Booksellers in the Netherlands and abroad could purchase each of the instalments for 5,40 guilders with plates and 3,40

[89] *Proceedings of the academy of natural sciences of Philadelphia* 3 (1846-47): 131-32.
[90] *Documents of the senate of the state of New-York.* 1:30 (1849): 137.

guilders without plates. A complete set thus cost 159,30 guilders. Regular costumers had to pay between 200 and 271 guilders in bookshops to acquire the three monographs.[91]

Conclusion

By following Reinwardt to Leiden, this chapter has shown that in the 1820s the city witnessed the emergence of different approaches to the study of natural history which were to remain influential in the Netherlands throughout the nineteenth century. The success or failure of each of these styles was closely connected to the status and authority of several individuals and the economic and political situation of the Dutch kingdom. As a wealthy aristocrat and owner of a large private natural historical cabinet, though one who had never received an academic degree, Coenraad Jacob Temminck promoted a natural history based on the collection, preparation, precise description and classification of a large number of natural specimens. Temminck buttressed his claim of authority by referring to his reputation as an outstanding bird expert, author of illustrated monographs and owner of a unique and valuable private collection of stuffed birds. As director of a new 'national' museum for natural history, Temminck continued this approach, but on a much larger scale. His new status now allowed him to establish and control a global network of collectors who endowed the museum with a rapidly growing number of specimens, notes and illustrations. The majority of the new material stemmed from the Dutch possessions in the Netherlands Indies.

In contrast to Temminck, Reinwardt's bid for scientific authority was based on his claim of being able to manage the complexities of investigating nature in the field. In both his inaugural lecture and his unfinished travel account, Reinwardt portrayed himself as an heroic traveller and virtuous administrator who had risked his life in the colonies for the public good. Despite many perils from diseases to unfavourable weather conditions, he had succeeded in his efforts to collect a large number of specimens, make observations and take measurements in an effort intended ultimately to maximize the productivity of the colony. Even on the top of smoking volcanoes he had mustered the courage to check and read his barometer and thermometer and enter his observations in his travel diary. In the course of creating his self-portrait, Reinwardt passed over the many

[91] Bastin and Brommer, *Nineteenth century prints and illustration,* 15.

porters, guides, civil servants, gardeners, translators, draftsmen, and others who had in fact helped him to investigate, structure, name, manage and improve an unknown environment and society.

Reinwardt's appeal to the king and his ministers to offer him the institutional background and financial support to publish a *Flora Javanicorum* and a 'physical geography' (*physikalische aardbeschrijving*) remained unheeded in The Hague. He instead was forced to spend his time and energy on managing the botanical garden and teaching medical students botany and chemistry. The reasons for this royal neglect laid in colonial politics. Even as Reinwardt was publicly promoting his fieldwork and his planned publications in the mid-1820s, Willem I and his advisors were realizing that the General Committee and Van der Capellen had failed to set up an efficient exploitation system on Java. Colonial debts were increasing and the outbreak of the Java War in 1825 was a harbinger of an even more costly future. Since Reinwardt had functioned as an important colonial advisor during these early years, it is not surprising that the colony's problems also damaged his reputation as an able administrator and investigator simply by association.

Reinwardt's pretentions to be the acknowledged expert on the natural history of Java was the arrival of his former assistant, Carl Ludwig Blume, who reached Leiden shortly after he did. While Reinwardt had lost much of the material he and his numerous helpers had collected in the colony due to shipwreck, Blume returned with an incredible amount of dried specimens, notes and a few preliminary publications. This 'private' herbarium was eventually the trump card that enabled Blume to establish himself as an expert of Java's flora. Owing to the growing royal interest in colonial natural history, he was able to claim the directorship of a new national institution for botanical study, a professorship at Leiden University and the financial support for a series of monographs on the flora of Java. As director of the National Herbarium Blume eventually obtained such a strong quasi-monopoly on the interpretation of Java's flora that he could compel Reinwardt and other plant collectors to hand over their collections and notes to his institution, where they were locked away even from the very people who had collected them in the first place.

For Reinwardt, the situation could have been worse. Although he never managed to receive the status and reputation of an acclaimed traveller and expert of Java's flora, his position as director of an academic garden and permanent professor at Leiden University allowed him to remain active in the field. In the years until his retirement in 1845/46, he intensified his

contacts with old friends and gave many lectures at learned societies in the Netherlands and abroad. Moreover, he continued to advise the government in The Hague on a broad array of practical issues such as the cultivation and exploitation of economically useful crops and the detection of natural resources in colonial areas. After his death in 1854, however, the public's memory of Reinwardt faded away. For highly specialized practitioners of geology, botany, zoology, mineralogy and other emerging disciplines, actors such as Reinwardt, whose careers and identities were based on their 'virtue' and 'utility' for the sake of the public good, appeared as odd relicts of a long-forgotten era.

Conclusion

This in-depth analysis of the career of Caspar Georg Carl Reinwardt has shed light on the co-evolutionary character of governance, empire and science in the late eighteenth and early nineteenth centuries Netherlands and its possessions in the Malay Archipelago. Hybrid figures such as Reinwardt, who never received an official diploma, were apparently able to switch between the professional realms of universities, botanical gardens, museums, and domestic and colonial administrations. This study argues that the seeds of Reinwardt's professional flexibility lay mainly in his training as a chemist and apothecary in one of Amsterdam's chemical workshops and his socialization in a broader cultural context where the improvement of society and economy played a crucial role.

The first chapter of this study has tried to reconstruct the material and intellectual milieu in which Reinwardt was trained. Archival research has shown that he was employed as an assistant at a chemist's/apothecary's workshop in Amsterdam. Unlike most apothecaries, who only produced medical drugs, chemists also supplied Amsterdam's processing industries with large quantities of chemicals. Owing to quickly rising prices for raw materials in the aftermath of the Fourth Anglo-Dutch War, chemist-apothecaries such as Theodorus Petrus Schonck and Johannes Petrus

Kasteleyn turned to and promoted new chemical practices and techniques to guarantee the profitability of their small businesses. Central element of their claims voiced in letters and pleas towards the city council of Amsterdam, was the improvement of the municipal training of young chemists and apothecaries. Beside a better theoretical foundation of their education, pupils were obliged to attend practical classes preferably taught by a public lecturer who was experienced in handling and using costly measuring devices such as thermometers, barometers, scales, and aerometers. Moreover, they urged the city council to sponsor the establishment of a well-equipped public laboratory with space adequate for a large number of listeners. Such a laboratory was, in their view, necessary to demonstrate young chemists, apothecaries, and manufacturers the benefits that could accrue from applying measuring and other devices in various productive contexts. Reinwardt was thus trained in a climate where accuracy, quantification and experimentation played a crucial role.

Similar ideas were voiced in literary and learned societies in Amsterdam and Haarlem. As a member of such societies Reinwardt entered a world where students, physicians, academic professors, lawyers, merchants, chemists, agriculturists, apothecaries, civil servants, and patriot thinkers regularly came together to socialize and discuss ideas to mitigate the country's economic and moral decline. The underlying idea of these societies was the notion that individuals could strengthen their identities as virtuous and moral citizens by discussing classical texts, watching experiments and listening to each other's lectures.

Although Reinwardt had never received an official diploma for his services as chemical and pharmaceutical assistant at his brother's pharmacy, he was eventually made professor of chemistry, natural history, and botany at the university in Harderwijk in 1800. The underlying reason for this appointment lay, as the second chapter shows, in the pragmatic politics of the day. In particular in the years after the Batavian Revolution in 1795, the new administrators sparked various initiatives to improve and centralize the country's agriculture, economy and administration. For individuals such as Reinwardt who had received a thorough training in all practical aspects of chemistry and botany it was thus relatively easy to switch to the academic realm. Even the fact that Latin was still the official language at universities was no obstacle, for during his years in Amsterdam, he had acquired an excellent command of Latin and Greek. Such skills had also helped him to gain access to Amsterdam's literary societies.

During his years in Harderwijk (1800-1806), Reinwardt played a hybrid role: on the one hand, he functioned as a university teacher, on the other hand he served as a member of provincial committees for agriculture and medical supervision. As an academic teacher, he taught medical and other students how to apply chemistry and botany for various useful ends. As he had been taught during his own apprenticeship in Amsterdam, Reinwardt stressed the importance of practical laboratory experimentation in his classes. He thus taught his students how to use and calibrate measuring devices which were essential for improving chemical experiments, agriculture and manufacturing processes. He also encouraged his students to explore and investigate the flora around Harderwijk. A few of the collected plants were eventually cultivated in the university's expanding botanical garden.

In his function as administrator, Reinwardt carried out field surveys and wrote reports on various pressing issues. He also helped one of the key figures in the new Batavian administration, Jan Kops, to prepare the third volume of an illustrated and detailed description of economically exploitable plants (*Flora Batava*). The discussion of Reinwardt's years in Harderwijk demonstrates that his practical botanical and chemical expertise made his integration into the new setting a relatively easy endeavour. Apart from his academic duties, Reinwardt found time to prove his efficiency and virtue as an expert in agriculture and public health care. Since his work in the provincial committee was unsalaried, he likely expected to derive career benefits from his civic engagement.

The third chapter built a narrative around the abrupt end of Reinwardt's career as an academic in Harderwijk. When Louis Napoleon visited the university in 1806, he appointed Reinwardt almost instantly as director of a new botanical garden and menagerie in Haarlem. In his new post, Reinwardt was responsible for laying out the new garden as well as the exchange, acclimatization, and cultivation of 'oeconomic' and exotic plants. Owing to the short reign of Louis Napoleon, the garden was never fully established and Reinwardt was eventually forced to look for new ways to secure his living. His close friendship with the influential Martinus van Marum, secretary of the Dutch Society of Sciences and director of Teylers Museum, helped the former apothecary and academic to gain access to Haarlem's learned and wealthy elite. Van Marum, for instance, ensured that Reinwardt was made member of the Dutch Society of Sciences. The two men shared a deep passion for experimental chemistry and botany and Van Marum often received Reinwardt in his private garden. To compensate for his colleague's and friend's social lobbying on his behalf, Reinwardt regularly

offered Van Marum plants and reviewed papers which individuals had submitted to the Dutch Society of Sciences. During his years in Haarlem, Reinwardt thus used learned societies, a well-proven tool in Dutch society, as vehicle to secure and further his career.

Reinwardt was also a member of the Royal Institute in Amsterdam, which was established in early 1808 by Louis Napoleon who viewed it as an advisory organ for his administration. Reinwardt thus often formed part of committees set up to examine and evaluate pressing governmental issues such as the calibration of measuring devices used for the levying of taxes. At the same time, the Institute offered its members a platform to promote their skills and expertise. Reinwardt, for instance, used the Institute to fashion himself as a travelling botanist who had surveyed large parts of the flora of the province of Holland in order to compile a 'plant geography' of the region. Since he had also carried out chemical analyses of different types of soil, he stressed the fact that his fieldwork would facilitate the quest for valuable ore deposits under the earth's surface. Owing to the country's notorious lack of natural resources, such claims must have attracted attention among his superiors in Amsterdam and The Hague. The third chapter thus shows how societies such as the Dutch Society of Sciences in Haarlem and the Royal Institute in Amsterdam could function as alternative vehicles for a career in the overlapping fields of science and governance in the times of political unrest.

Reinwardt's strategy was initially successful. After the French left the country and Willem I assumed power in 1815, he was mad a high-ranking colonial civil servant with the special task to survey and improve Java's agriculture, industries, public health care and educational system. Additionally, he was obliged to collect natural historical specimens for the State Cabinet of Natural History in Amsterdam. Reinwardt hoped that an extended stay in the East Indies would reward him with the status and reputation of a famous scientific traveller who could dedicate the rest of his life time in the Netherlands publishing the results of his trip to the Malay Archipelago.

The fourth chapter illustrates that, in practice, the dual task of collecting and improving the administration and agriculture of the Dutch colony turned out to be a complex endeavour. Until the summer of 1817, Reinwardt was preoccupied with pressing governmental issues that kept him most of the time in Batavia and Buitenzorg. In order to prove his virtue as an administrator, he was expected to read and evaluate a large number of official documents and advise the colonial government in the form of written reports.

The collecting of natural historical specimens was mostly carried out by other colonial administrators, adventurers and military men who were, in one way or another, connected with the colonial government. Reinwardt's draftsmen, the Bik brothers, and his gardener Kent, eventually took care that the items which arrived in Reinwardt's house were carefully prepared and packed in boxes for shipping to the Netherlands. Many of these precious cargoes—augmented by plants from the botanical garden established at Buitenzorg on Reinwardt's initiative—were lost at sea. During the first period of his stay Reinwardt and his crew thus spent most of their time and energy on developing Batavia and Buitenzorg into a nodal point for colonial governance and science.

When Reinwardt and his colleagues Baron Van der Capellen and Cornelis Theodorus Elout realized that administrating and investigating Java from Batavia and Buitenzorg proved elusive and ambiguous undertakings, they decided to organize a tour of inspection around the island. The main aim of the months-long journey was to gain more information on the current political, social, agricultural and economic state of more remote provinces. Reinwardt's task was again to collect, summarise and judge the information gathered on the spot. In a few cases, Reinwardt used his measuring devices to legitimize his advices which had to be submitted in the form of written reports. During the tour of inspection Reinwardt and his superiors depended on the colonial infrastructure and the assistance of local European and indigenous administrators. The same was even more true during subsequent journeys to the Preanger region in the hilly hinterland of Batavia, and to the Moluccas. The diaries of Reinwardt and one of his draftsmen shed considerable light on the different groups and individuals responsible for facilitating the collecting and preparing of natural historical specimens and statistical data in areas where colonial infrastructure was lacking.

The fifth chapter, however, shows that Reinwardt tended to remain silent about the exact origins of his observations and measurements in his retrospective accounts of his fieldwork in the Malay Archipelago. In lectures held in front of the members of the Batavian Society for Arts and Sciences as well as his academic colleagues, prospective sponsors, and friends in the Netherlands, Reinwardt rather fashioned himself as a solitary and virtuous traveller *and* administrator who had risked his life in Java and the neighboring islands for the public good. In his lectures Java appears as a sparsely populated island whose rich and diverse nature was ripe for further economic exploitation and natural historical investigation. Reinwardt hoped that this deliberately construed self-image would attract powerful sponsors

who would finance his planned publications on the nature and society of the Malay Archipelago. A wealthy and influential patron would also have allowed him to quit his tiresome position as academic teacher and focus on his career as a traveller and author of scientific monographs weaving the outcome of his varied field research together into a proto-ecological account on how wind, water, fire and air had shaped nature in the Netherlands and its colonial possessions. Such an account would have secured Reinwardt's status and reputation not only in the Netherlands, but also abroad.

The sixth chapter shows that in the end Reinwardt's strategy failed. When Reinwardt returned to the Netherlands, the 'oeconomic' culture in which he had been trained and socialized as a young man (see chapter one) was declining. Since the colonial possessions in the East ultimately proved to be a highly unprofitable endeavour, highly placed decision-makers in the Netherlands lost faith in Reinwardt's efficiency and virtue as a colonial administrator and scientific traveller in the late 1820s. Instead of receiving generous governmental support for popularizing his hybrid fieldwork in the Netherlands, he was confronted with the king and his ministers' decision to appoint as director of a new National Museum of Natural History Coenraad Jacob Temminck, the owner of a splendid bird collection who had never held an administrative post. While Temminck managed to set up a global network of collectors, Reinwardt was forced to spend most of his time and energy on teaching chemistry, botany, geology and natural history and administrating Leiden's *Hortus Botanicus*. Although Reinwardt tried to finish his travel account and an illustrated monograph on Java's flora (*Flora Javanicorum*), these books never came off the press owing to Reinwardt's lack of time and sponsors.

Apart from losing the support of the Dutch king and his ministers, Reinwardt's plans were also foiled by his former assistant Carl Ludwig Blume, who arrived in Leiden with an immense collection of dried plants. Since Blume was looking for a permanent position in Europe, he offered his collection to the king. In return, Blume claimed a financial compensation, the directorship of a new National Herbarium, the title of a professor, and sponsorship of a lavishly illustrated series of monographs on Java's flora. After the king had agreed to these preconditions, Reinwardt was eventually asked to hand over his own collection of dried plants and notes to Blume.

While in the years to come Blume prepared the successive publication of the *Flora Javae* and other monographs, Reinwardt focused his attention on delivering lectures on his fieldwork in the Indies at learned societies in the Netherlands and abroad. But these lectures never caught the

attention and audience which Blume's and Temminck's publications and institutions did. Reinwardt was thus soon characterized as someone who had not only failed as colonial 'administrator', but also as a 'naturalist', 'botanist', 'geologist', 'zoologist', or as a mere 'collector' of natural historical specimens. It is therefore not surprising that Reinwardt often remained outside the scope of historical narratives which used those retrospectively shaped categories and fields as starting points for their analyses. This study has shown that the opposite was the case. Owing to a shared culture of moral and economic improvement, hybrid figures such as Reinwardt could pursue an impressive, but later often forgotten career, in the co-evolutionary realms of science, governance, and empire in the late eighteenth and early nineteenth centuries Netherlands and its colonial possessions in the Malay Archipelago.

Samenvatting

van

Hybrid Ambitions: Science, Governance, and Empire
in the Career of Caspar Georg Carl Reinwardt (1773-1854)

door

Andreas Weber

Dit proefschrift over de carrière van Caspar Georg Carl Reinwardt werpt licht op het co-evolutionaire karakter van wetenschap, (politiek) bestuur en kolonialisme in de late achttiende en vroege negentiende eeuw in Nederland en zijn overzeese gebieden in de Maleise Archipel. Hybride - en door historici vergeten - figuren zoals Reinwardt die nooit een officieel diploma hebben behaald, konden blijkbaar gemakkelijk van professioneel terrein veranderen. Reinwardt vervulde diverse functies bij universiteiten, een botanische tuin, en in het binnenlands- en koloniaal bestuur. Aan deze professionele flexibiliteit liggen twee belangrijke redenen ten grondslag: ten eerste Reinwardts praktische opleiding als scheikundige en apotheker-assistent bij een klein Amsterdams chemisch bedrijf. Ten tweede zijn socialisatie in een bredere culturele context waarin de verbetering van de samenleving en de economie een cruciale rol heeft gespeeld.

Het eerste hoofdstuk van deze studie reconstrueert het materiële en intellectuele milieu waarin Reinwardt werd opgeleid. Archiefonderzoek toont aan dat Reinwardt werkzaam was bij een 'chemistenwinkel' in Amsterdam. In tegenstelling tot reguliere apothekers, die alleen medicijnen bereidden, leverden chemisten ook chemicaliën aan trafieken en fabrieken in Amsterdam. Aangezien de prijs voor ruw materiaal na de Vierde Engelse Zee-oorlog steeg, werden Amsterdams chemisten en apothekers zoals Theodorus Petrus Schonck en Johannes Petrus Kasteleyn voorstanders van nieuwe productie- en onderwijsmethodes op het gebied van de scheikunde. Naast

een betere theoretische onderbouwing van hun opleiding, zouden leerlingen volgens hen meer praktijklessen moeten krijgen. Ze stelden voor om een nieuwe openbare lector aan te stellen die ervaren was in het gebruik van kostbare meetapparatuur zoals thermometers, barometers, weegschalen en aerometers. Bovendien verzochten de chemisten het stadsbestuur om een goed uitgerust stedelijk laboratorium op te richten, waar genoeg ruimte was voor een groot aantal luisteraars. Een dergelijk laboratorium was in hun ogen nodig om jonge chemisten, apothekers en fabrikanten te laten zien hoe productiemethodes verbeterd konden worden. Reinwardt was dus opgeleid in een klimaat waarin kwantificering en beter onderwijs de sleutel moesten vormen tot verbetering van binnenlandse economie en nijverheid.

Deze gedachte over verbetering stond ook centraal in de literaire en geleerde genootschappen waar Reinwardt vanaf zijn jonge jaren lid van werd. Reinwardt verkeerde in een wereld waarin studenten, artsen, academische professoren, advocaten, kooplieden, scheikundige, landbouwers, apothekers, ambtenaren en patriottische denkers regelmatig bij elkaar kwamen om het land voor een economisch en moreel verval te bewaren. De achterliggende gedachte van deze genootschappen was dat mensen hun identiteit als nuttige en deugdzame burgers konden verbeteren door het bespreken van klassieke teksten, het bekijken van experimenten en het luisteren naar elkaars lezingen.

Hoewel Reinwardt nooit een officieel diploma voor zijn werkzaamheden als chemisch- en farmaceutisch-assistent heeft behaald, werd hij toch tot hoogleraar in de chemie, natuurlijke historie, en plantkunde aan de universiteit in Harderwijk in 1800 benoemd. Het tweede hoofdstuk laat zien dat de onderliggende redenen voor deze benoeming in de pragmatische politiek van dat moment lagen. In de jaren na de Bataafse Revolutie in 1795 initieerden de nieuwe machthebbers verschillende initiatieven om landbouw, economie, en administratie te centraliseren en te verbeteren. Voor personen als Reinwardt die een opleiding in alle praktische aspecten van scheikunde en botanie had doorlopen, was het daardoor tamelijk eenvoudig om naar de academische wereld over te stappen. Zelfs het feit dat het Latijn nog steeds de officiële taal van de universiteiten was, vormde geen obstakel, want gedurende zijn jaren in Amsterdam had Reinwardt de nachtelijk uren gebruikt om Latijn en Grieks te leren. Dergelijke vaardigheden had hem ook geholpen om toegang tot de literaire genootschappen in Amsterdam te verwerven.

Tijdens zijn jaren in Harderwijk (1800-1806) had Reinwardt een hybride positie als academicus en lid van provinciale commissies in Gelderland. Als hoogleraar onderwees hij studenten hoe ze scheikunde en

plantkunde tot verschillende nuttige doeleinden (bijvoorbeeld landbouw) konden aanwenden. Zoals hij het tijdens zijn leerjaren in Amsterdam had gezien, benadrukte Reinwardt het belang van experimentele vaardigheden in zijn lessen. Hij leerde zijn leerlingen dat experimenteren en het correct gebruiken van meetinstrumenten essentieel waren voor de verbetering van scheikundige processen. Verder moedigde hij zijn studenten aan de eigenschappen van de flora rond Harderwijk te verkennen en te onderzoeken.

In zijn functie als lid van de provinciale comités voor landbouw en medische supervisie heeft Reinwardt veldonderzoek uitgevoerd en verslagen over verschillende urgente problemen geschreven, bijvoorbeeld over insecten die schadelijk kunnen zijn voor de landbouw. Reinwardt hielp ook Jan Kops, een van de sleutelfiguren in het nieuwe Bataafse bestuur, met de Franse vertaling van plantnamen in het derde deel van de *Flora Batava*. De *Flora Batava* was een rijk geïllustreerd plantenboek waarin economische en andere planten uit Nederland uitvoerig beschreven werden.

De reconstructie van Reinwardts jaren in Harderwijk laat zien dat zijn praktische botanische en chemische vaardigheden de integratie in een academische context mogelijk maakten. Naast zijn academische plichten, vond Reinwardt ook nog tijd om zijn nut en waarde als expert voor landbouw en publieke gezondheidszorg te bewijzen. Omdat zijn participatie in deze commissies onbezoldigd was, kan men ervan uitgaan dat Reinwardt hoopte dat zijn maatschappelijke engagement uiteindelijk voordelen zou opleveren in zijn carrière.

Het derde hoofdstuk plaatst het abrupte einde van Reinwardts tijd in Harderwijk en zijn volgende carrièrestappen in een bredere context van politieke onrust en de betekenis van geleerde genootschappen voor wetenschap en bestuur. Toen koning Lodewijk Napoleon de universiteit in 1806 bezocht, benoemde hij Reinwardt vrijwel direct tot de directeur van de nieuwe koninklijke botanische tuin en menagerie. In deze functie was Reinwardt vooral verantwoordelijk voor de aanleg van de nieuwe tuin en de uitwisseling, acclimatisatie en teelt van 'oeconomische' (nuttige) en exotische planten. Vanwege de korte regeerperiode van Lodewijk Napoleon werd de tuin nooit volledig gerealiseerd. Reinwardt werd gedwongen om naar nieuwe manieren te zoeken om zijn levensonderhoud veilig te stellen. Vooral zijn hechte vriendschap met de invloedrijke Martinus van Marum, secretaris van de Hollandsche Maatschappij der Wetenschappen en directeur van het Teylers Museum, heeft hem hierbij geholpen. De twee mannen deelden een passie voor experimentele scheikunde en plantkunde. Van Marum ontving

Reinwardt vaak in zijn privétuin buiten het centrum van Haarlem. En hij zorgde er voor dat Reinwardt lid kon worden van de Hollandsche Maatschappij der Wetenschappen. In ruil voor Van Marums hulp stuurde Reinwardt zijn vriend vaak planten en besprak hij inzendingen op de prijsvragen van de Hollandsche Maatschappij der Wetenschappen.

Reinwardt werd ook lid van het Koninklijk Instituut in Amsterdam, dat begin 1808 was opgericht door Lodewijk Napoleon. De koning zag het Instituut als een adviesorgaan van zijn bestuur. Reinwardt maakte deel uit van commissies die ingesteld werden om urgente bestuurlijke vraagstukken op te lossen. Tegelijkertijd bood het Instituut zijn leden een platform om hun vaardigheden en expertise aan vakgenoten en bestuurders te presenteren. Reinwardt gebruikte het Instituut om zich in lezingen neer te zetten als natuurkenner die grote delen van Holland had bereisd en onderzocht. In deze lezingen benadrukte hij dat hij van plan was om een 'plant geografie' van Nederland te schrijven. Verder zouden zijn scheikundige bodemanalyses het mogelijk maken om natuurlijke grondstoffen op te sporen. Omdat Nederland nauwelijks over natuurlijk hulpbronnen beschikte, moet Reinwardts lezing wel belangstelling hebben opgewekt bij hooggeplaatste ambtenaren in Den Haag en Amsterdam. Het derde hoofdstuk laat dus zien dat, in tijden van politieke onrust, genootschappen een alternatief platform vormden voor een loopbaan tussen wetenschap en bestuur.

Reinwardts strategie was in eerste instantie succesvol. Nadat de Fransen het land hadden verlaten en koning Willem I de macht had overgenomen in 1815, werd Reinwardt benoemd in een hoge functie als adviseur van de nieuwe koloniale regering in Nederlands-Indië toevertrouwd. Reinwardts taken waren breed: hij kreeg de opdracht om de landbouw, nijverheid, openbare gezondheidzorg en het onderwijssysteem te verbeteren. Ook werd hem gevraagd een uitvoerige statistische beschrijving van Java voor te bereiden. En ten slotte was hij verantwoordelijk voor het verzamelen van planten en dieren voor het 's Lands Kabinet van Natuurlijke Historie in Amsterdam. Reinwardt hoopte dat zijn nieuwe functie hem de status en reputatie van een beroemd wetenschappelijk reiziger zou opleveren, zodat hij de rest van zijn leven aan publicaties kon werken.

Het vierde hoofdstuk laat zien dat het in de praktijk lastig was om het verzamelen van planten en dieren te combineren met het verbeteren van landbouw, onderwijs en gezondheidszorg in Nederlands-Indië en dat de hulp van lokale experts onontbeerlijk was. Tot de zomer van 1817 was Reinwardt volop bezig om de koloniale regering (commissie-generaal) vanuit Batavia en Buitenzorg te adviseren. Van hem werd vooral verwacht om een groot aantal

stukken te lezen en hierover dan weer bericht uit te brengen of orders uit te delen. Het verzamelen van natuurhistorische objecten werd meestal overgelaten aan andere ambtenaren, avonturiers of soldaten die op de een of andere manier in relatie stonden met de koloniale regering. Reinwardts tekenaren, de gebroeders Bik, en zijn tuinman Kent zorgden ervoor dat de specimen klaar gemaakt werden voor verzending naar Nederland. Door verscheidene schipbreuken echter, hebben veel van deze waardevolle objecten - waaronder ook planten van de botanische tuin in Buitenzorg - Nederland nooit bereikt. Tijdens de eerste fase van hun verblijf waren Reinwardt en zijn helpers dus vooral bezig om Batavia en Buitenzorg in een knooppunt voor wetenschap en bestuur te transformeren.

Toen Reinwardt en zijn superieuren Baron Van der Capellen en Cornelis Theodorus Elout zich realiseerden dat het zonder nadere kennis van zaken onmogelijk was om Java vanuit Batavia en Buitenzorg te besturen, besloten ze - net als Johannes Goldberg in Nederland iets meer dan twee decennia daarvoor - een inspectiereis over het eiland te organiseren. Het belangrijkste doel van de maandenlange reis was om meer informatie over de daadwerkelijk politieke, sociale en economische toestand van de afgelegen provincies te verkrijgen. Tijdens de reis kreeg Reinwardt de taak om gegevens te verzamelen, samen te vatten en te beoordelen in de vorm van rapporten. In enkele gevallen gebruikte Reinwardt zijn meetinstrumenten om zijn adviezen met cijfers te onderbouwen. Tijdens deze inspectietour waren Reinwardt en zijn meerderen volledig afhankelijk van lokale Europese en inheemse bestuurders. Hetzelfde was nog meer het geval tijdens Reinwardts daaropvolgende reis naar de Preanger regio in het heuvelachtige achterland van Batavia en tijdens zijn zee expeditie naar de Molukken. De dagboeken van Reinwardt en een van zijn tekenaars werpen licht op de verschillende groepen en personen die het verzamelen van zeldzame natuurhistorische objecten en statistische gegevens mogelijk maakten in gebieden waar de koloniale infrastructuur grotendeels ontbrak.

Het vijfde hoofdstuk toont aan dat in Reinwardts retrospectieve reisbeschrijvingen lokale helpers vaak niet meer genoemd worden ten bate van zijn eigen reputatie als reizende geleerde. In lezingen voor de leden van het Bataviaasch Genootschap voor Kunsten en Wetenschappen in Batavia en zijn academische collega's in Nederland presenteerde Reinwardt zich als eenzame en vlijtige reiziger *en* als koloniaal ambtenaar die zijn leven op Java en de naburige eilanden heeft geriskeerd voor het algemeen belang. In zijn lezingen beschrijft hij Java als een dunbevolkt eiland met een rijke en diverse natuur, dat rijp is voor verdere economische exploitatie en natuurhistorisch

onderzoek. Reinwardt hoopte dat zijn zorgvuldig geconstrueerde zelfbeeld geldschieters ervan zou overtuigen om publicaties over de natuur en samenleving van het Maleise Archipel te financieren. De steun van invloedrijke patroons zou hem in staat stellen om zijn toekomstige taken als hoogleraar in Leiden in te perken zodat hij zich volledig kon wijden aan het schrijven van wetenschappelijke boeken. Reinwardt was van plan om zijn reisaantekeningen in vorm van een soort 'proto-ecologisch' verhaal te vertellen. In dat verhaal zou duidelijk moeten worden hoe de elementen wind, water, vuur en lucht de verschillende eilanden in het Maleise Archipel in de tijd gevormd hadden. Een dergelijke beschrijving zou zijn roem in het binnen- en buitenland moeten vestigen.

Het zesde hoofdstuk laat zien dat Reinwardts strategie uiteindelijk mislukte vanwege een geleidelijke omslag in het bestuurlijke klimaat in Nederland. Toen Reinwardt naar Nederland terugkeerde, was de 'oeconomische' cultuur waarin hij was opgeleid en gesocialiseerd aan het verdwijnen. Het vertrouwen in metende en reizende generalisten als Reinwardt boette in kracht in omdat de koloniale bezittingen op korte termijn alleen maar financieel verlies opleverden. In plaats van overheidssteun te ontvangen, werd Reinwardt juist geconfronteerd met het feit dat koning Willem I een specialist als directeur van een nieuw Rijksmuseum van Natuurlijke Historie had geïnstalleerd. De nieuwe directeur, Coenraad Jacob Temminck, was wel een zeer bekende vogelexpert uit het Amsterdamse patriciaat, maar had nooit een bestuurlijke functie uitgeoefend.

Terwijl Temminck in de daaropvolgende jaren een wereldwijd netwerk van verzamelaars oprichtte, werd Reinwardt gedwongen om het grootste deel van zijn tijd en energie te besteden aan het onderwijs in de scheikunde, plantkunde, geologie en natuurlijk historie. Als hoogleraar botanie in Leiden was hij ook nog voor het beheer van de botanische tuin verantwoordelijk. In deze jaren bleef Reinwardt werken aan een reisverslag en een flora van Java (*Flora Javanicorum*). Maar deze boeken kwamen vanwege een gebrek aan tijd en geld nooit af.

Behalve door het ontbreken van overheidssteun werden Reinwardts plannen nog gedwarsboomd door zijn voormalige assistent uit Java, Carl Ludwig Blume. Blume arriveerde in Leiden met een enorme collectie gedroogde planten. Deze bood hij aan koning Willem I aan, in ruil voor een financiële compensatie, het directeurschap van een op te richten 's Rijks Herbarium, een hoogleraarschap en de sponsoring van een reeks rijk geïllustreerde monografieën over de flora van Java. Nadat de koning met deze

voorwaarden had ingestemd, kreeg Reinwardt zelfs de opdracht om zijn eigen collectie van gedroogde planten aan Blume over te dragen. Terwijl Blume in de daaropvolgende jaren grootschalige publicaties realiseerde, concentreerde Reinwardt zich op het geven van lezingen over zijn werkzaamheden in de koloniën. Deze lezingen trokken echter nooit zoveel publieke aandacht als de publicaties en instellingen van Temminck en Blume.

Reinwardt zou later gekarakteriseerd worden als iemand die noch als koloniaal 'bestuurder', noch als 'natuuronderzoeker', 'botanicus', 'geoloog', 'zoöloog', of zelfs als 'verzamelaar' van natuurhistorische objecten werkelijk geslaagd is. Het is dan ook niet verwonderlijk dat Reinwardt buiten de focus van de geschiedschrijving is gebleven, waarin deze retrospectieve categorieën doorgaans als vertrekpunt voor analyse gelden. Deze categorieën zijn producten van latere specialiseringen in wetenschap en bestuur. Deze studie heeft juist aangetoond dat er in Nederland rond 1800 een gedeelde cultuur van 'verbetering' bestond, waarin figuren als Reinwardt een indrukwekkende carrière als expert in overheidsdienst konden maken.

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Curriculum vitae

Andreas Weber was born in Ellwangen/Jagst (Germany) in 1979. From 1999 to 2006, he studied history and German linguistics and literature at the Universities of Bamberg and Leiden. In 2005, he obtained an MA in History (cum laude) from Leiden University. One year later, in 2006, he completed his studies at the University of Bamberg (1. Staatsexamen). During his PhD research (2007 to 2011), Andreas was affiliated with the Institute for History of Leiden University as an external PhD student. His research was financed by the *Studienstiftung des deutschen Volkes* (2007-2010) and the *Gratama Stichting* (2011). Since the end of 2011, he has been working as a postdoc researcher at the University of Twente in a project on "Chemistry in everyday life" in the late Dutch Republic.