Chapter IV: Van der Willigen – Precision and the Discipline of Physics

I. An Unexpected Guessing Game (Intro)

One year after Elisa van der Ven had been appointed the new curator of Teylers Museum's scientific instrument collection, he sent his first detailed report on his activities and future plans for the collection to the trustees of the Teyler Foundation. It was April 1880, and van der Ven reported that he had spent a great deal of time trying to gain an overview of what instruments he had inherited from his predecessors, and trying to figure out what exactly they had acquired them for. This, he stated, had been far more difficult than he had expected for a number of reasons: his predecessors appeared not to have been particularly eager to record their thoughts and plans in writing, for instance, and the instruments did not appear to have been stored in a particularly orderly fashion. As van der Ven complained:

"In the museum the strangest objects were then to be found together, so that often from a cupboard that seemingly served for the storage of similar instruments, different ones emerged, that had nothing to do with the others scientifically."[1]

But while this delayed his compiling a catalogue of the collection, what completely stumped van der Ven was a small building in the garden behind the museum that had been constructed by his immediate predecessor, Volkert Simon Maarten van der Willigen, sometime between March 1866 and February 1867.[2] The report to the trustees contains a remarkably frank admission that he didn't have a clue why this building – which was roughly the size of a large hut, was built in stone, had a large slit in its roof and was referred to as the "observatory" – had been erected. Van der Ven literally wrote about this building in the garden: "For what purpose it has been put there is difficult to guess."[3]

[1] "In het museum toen stonden vrij wel de meest vreemdsoortige zaken bij elkander, zoodat dikwijls uit een kast, die schijnbaar geheel ter berging van gelijkwaardige instrumenten diende, andere te voorschijn kwamen, die wetenschappelijk daarmede niets hadden te maken." E. van der Ven: "Verslag, betreffende den toestand van en de werkzaamheden van Teylers Physisch Kabinet, voor het jaar 1879/80", 02.04.1880, Harlem, ATS, vol. 191.
[2] Gerard L'E. Turner, *The Practice of Science in the Nineteenth Century: Teaching and Research Apparatus in the Teyler Museum* (Haarlem: Teylers Museum, 1996), 16. The approximate construction date can be deduced from the costs incurred by the building activities. The relevant bills are to be found in: "Kasbewijzen", 1866-1867, Haarlem, ATS, vol. 698. I am grateful to Marijn van Hoorn for drawing my attention to these sources.
[3] "Voor welk doel het daar is neergezet is moeilijk te gissen." E. van der Ven: "Verslag, betreffende den toestand van en de werkzaamheden van Teylers Physisch Kabinet, voor het jaar 1879/80", 02.04.1880, Harlem, ATS, vol. 191.

The only thing that was clear was that the building had been used for measurements of some sort. One promising clue seemed to be that no iron had been used in the building, which suggested that any sort of electromagnetic induction was to be avoided. However, van der Ven pointed out that this, too, failed to explain why he had found a Universal Instrument "with thick iron axles" in the building.[4]

To this day the mystery of the "observatory's" exact purpose has never been solved completely. Van der Willigen's publications, together with other sources from the archives of the Teyler Foundation – e.g. on their bookkeeping or the trustees' meetings – do not provide any conclusive evidence. Nevertheless there are a few good clues (such as the lack of iron in the building): the positioning of the slit in the building's roof for instance indicates that the passage of stars through the meridian might have been determined from this building – which would also help explain why it was labelled the "observatory". At one point during his career van der Willigen was trying to establish a standard length, and Gerard Turner for one has argued that this aim "establishes the link between the small building in the Museum grounds and many of the instruments acquired by Teyler's from 1865".[5] This is certainly not at odds with van der Ven's own summary in his report to the trustees:

"It is most likely that in the course of the years the intention has changed and that the instruments brought together there [in the observatory] were given the destination of keeping track through them of the true time."[6]

But what is of course most striking about all this confusion is that the trustees themselves were literally not aware of what was going on in their backyard, i.e. in the backyard of one of the institutions they were financing. Yet, as strange or even ignorant as this may sound at first, it is in fact indicative of something far more fundamental, and ultimately highly crucial to the overall status of the instrument collection: by the second half of 19th century science in general – and physics in particular – had become so specialised and complicated that it had become both incomprehensible and inaccessible to laypeople. Science was becoming something of a "black box": on the one hand technology and, by extension, science were affecting people's everyday lives on an unprecedented scale (think of the steam engine and photography); but on the other hand science itself, or, to phrase this more precisely, the research process through which the body of knowledge that was then deemed "scientific" was obtained, was becoming ever more incomprehensible and thereby also ever more puzzling to the general populace. Just as importantly, because all sciences – and, again, physics in particular – were increasingly relying on precise, quantitative measurement as the sole legitimate basis of all knowledge claims, the places where scientific research was being performed were becoming increasingly inaccessible to those not involved in the measurements themselves.

[4] "met dikke ijzeren assen"; Ibid.
[5] Turner, *The Practice of Science in the Nineteenth Century: Teaching and Research Apparatus in the Teyler Museum*, 17.
[6] "Allenwaarschijnlijkst is men in den loop der jaren van denkbeeld veranderd en heeft men aan de daar bijeengebrachte instrumenten de bestemming willen geven door hunne bemiddeling zich steeds rekenschap te kunnen geven van den waren tijd." E. van der Ven: "Verslag, betreffende den toestand van en de werkzaamheden van Teylers Physisch Kabinet, voor het jaar 1879/80", 02.04.1880, Harlem, ATS, vol. 191.

Viewed in these terms, one begins to understand why the trustees were not able to provide van der Ven with any detailed information of what had been going on in the "observatory": it would have been a lot to ask for them to understand their curator's research; and they would not have been welcome to pass by the observatory while van der Willigen was working there, for fear they might upset the sensitive instruments. Bearing this in mind one realises that their lack of comprehension should not be seen as a sign of ignorance, but rather of the immense freedom and complete independence van der Willigen had enjoyed as an employee of the Teyler Foundation. The trustees were obviously not interfering with, or trying to exert control over, his work.

What's more, the growing divide between amateurs and trained specialists would in fact have been exacerbated at Teylers, because in the Netherlands van der Willigen was one of the most ardent proponents of the idea that precise, quantitative measurement should serve as the basis of all physics. Precision was something of a mantra for him and he had built his formidable reputation amongst the Dutch physics community on the discipline with which he conducted his experimental research. Soon after the "observatory" had been built he himself grandiloquently stated: "Physics has definitively entered a new phase, […] the phase of exactitude and precision."[7] This was reflected in his choice of instruments to be acquired for Teylers Museum. As van der Ven mentioned in his report, the newest instruments in the collection indicated that "recently the intention has been to collect equipment in various areas for carrying out quantitative investigations".[8]

Crucially, however, it would of course not only have been the trustees who no longer understood what kind of research was being performed on the premises of Teylers Museum, but the visitors to the museum as well. It is highly symbolic that under van der Willigen's watch parts of the museum's scientific instrument collection were being removed from the original museum edifice to a separate building that was apparently off limits to anyone but van der Willigen himself. Admittedly this can be seen as the logical culmination of a gradual dissociation of laboratory premises from the museum building that had already begun with van Marum's construction of a separate laboratory in a building adjacent to the museum – but even so, the construction of the "observatory" and the fact that the trustees and van der Ven were unable to establish its exact purpose in even the most general of terms shows just how large the division between Teylers Museum as a publicly accessible collection on the one hand and the cutting edge research performed by the curators associated with the museum's scientific collections on the other hand had actually become since the museum had originally been conceived and van Marum had performed experiments with the electrostatic generator in the Oval Room.

---

[7] "La physique est entrée définitivement dans une phase nouvelle, […] la phase d'exactitude et de la précision." Volkert Simon Maarten van der Willigen, "Mémoire sur la détermination des indices de réfraction et sur la dispersion des mélanges d'acide sulfurique et d'eau," vol. 1, Archives du Musée Teyler (Harlem: Les Héritiers Loosjes, 1868), 74.

[8] "men vooral in den laatsten tijd op menig gebied zich heeft willen toerusten voor het doen van kwantitatieve onderzoekingen"; E. van der Ven: "Verslag, betreffende den toestand van en de werkzaamheden van Teylers Physisch Kabinet, voor het jaar 1879/80", 02.04.1880, Harlem, ATS, vol. 191.

This is all the more striking if one takes into account that at the very same time van der Ven was writing his report to the trustees in 1880, construction had already begun on what was to be the largest extension to Teylers Museum – crucially, this extension included a huge new entrance to the museum, which ensured passers-by could not miss this institution, and clearly put out a signal that visitors were welcome.[9] After having entered the museum through Teyler's former town house for more than a hundred years, visitors were now led through a two-storey high, neo-classical, monumental entrance, which emulated the design of other public cultural institutions such as theatres, opera houses, or of course other museums. This overt embrace of the public did not fail to serve its purpose: visitor numbers to the museum increased dramatically after 1885.[10]

These seemingly opposed developments – i.e. on the one hand the way in which the area where experimental research was performed was cordoned off and on the other hand the embrace of the public and conscious attempt to increase the accessibility and the number of visitors coming to Teylers Museum – form a crucial component in any attempt to understand the history and hybrid character of this institution. They are particularly important to keep in mind when assessing the scientific instrument collection's overall status within the larger organisational structure in which it was embedded. Put differently, these divergent factors are important in understanding what role the instrument collection played within Teylers Museum.

What´s more, these developments as they occurred on a very local level in Haarlem mirrored more general developments that were taking place on a far larger scale. On the one hand the relocation of the newest instruments to the observatory, away from the Oval Room, mirrors the demise of the cabinets of physics as they had been so popular at the end of the 18th century.[11] By the second half of the 19th century they had essentially become obsolete, or at best relics of the past, as laboratories run by trained physicists increasingly became the reserve of physical research. On the other hand the construction of the new annex to Teylers Museum mirrors the museum boom that swept the Western hemisphere during the second half of the 19th century. Not only were international exhibitions held on a frequent basis, but permanent museums established in practically every town, with the express purpose of serving and educating the population at large. Interestingly, however, these museums were mostly art museums, museums devoted to a community's cultural heritage, arts and crafts museums, or natural history museums – science museums, i.e. museums devoted to physical or chemical research and technology, were a far later phenomenon, and only really emerged at the beginning of the 20th century.

[9] On the construction of this new annex see: T. van Gestel and A.W. Reinink, "Het 'nieuwe museum' van Teyler (1877-1885)," in *"Teyler" 1778-1978* (Haarlem; Antwerpen: Schuyt, 1978), 223–322.
[10] Geert-Jan Janse, "Uit nieuwsgierigheid en ter onderricht," in *Teylers Museum 1784-2009: een reis door de tijd*, ed. Marjan Scharloo (Haarlem: Teylers Museum, 2009), 24.
[11] On the popularity and subsequent demise of 18th century cabinets of physics see: Huib J. Zuidervaart, "Natuurkundige instrumentenkabinetten: De opkomst en ondergang van een cultureel fenomeen," in *Druk bekeken: collecties en hun publiek in de 19e eeuw*, ed. Martin Weiss and Lieske Tibbe, vol. 3, De Negentiende Eeuw 34 (Hilversum: Verloren, 2010), 209–231.

The curious state of Teylers Museum's scientific instrument collection, roughly speaking after the demise of the 18th century cabinet and before the advent of science museums in their own right, is the main topic of this chapter. It will be addressed from the vantage point of Volkert Simon Maarten van der Willigen's life and career, which encompassed and reflected many of the changes that had a bearing on the way instrument collections were perceived and handled towards the end of the 19th century.

II. Volkert Simon Maarten van der Willigen (I): Early Years

1. Rockanje, Delft and Leiden

Volkert Simon Maarten van der Willigen was born in Rockanje, a small village about 30 kilometres south of Delft, on May 9th 1822 at 6 o'clock in the morning.[12] His father, Johannes van der Willigen, had been appointed pastor for the Dutch Reformed parish there in 1817 after having previously led a parish in Simonshaven, and was already about 45 years old.[13] The newborn's mother, Johannes' wife Gerarda Maria Elsabé Bodde, was about 27 years of age.[14] Volkert Simon Maarten – in all publications and letters he is always referred to by his full name – was not the couple's first child. He had two elder sisters, and a younger one was born seven years later.[15] One of his two elder sisters appears to have passed away in 1836 in Rotterdam. It is conceivable that this had something to do with the fact that Johannes van der Willigen asked to be retired from his parish in 1837, whereupon he appears to have moved to Delft with his entire family.[16] According to the 1839 census, the remaining five members of the family and a young housekeeper lived in Oude Delft 56.[17] The family was not rich, but by no means poor either. When Gerarda Maria died in 1865, her entire estate was valued at about f42.000.[18] Taking into account that a professor's annual salary was about f3000,- at the time, this was no small amount.

The next thing that is known about Volkert Simon Maarten is that he enrolled at the Philosophical Faculty of the University of Leiden in 1841.[19] It is not clear what school he had gone to before either in Delft or in Rockanje, his matriculation papers in Leiden only reveal

[12] "Geboorteakte", 09.05.1822, Streekarchief Voorne-Putten en Roozenburg, vol. 364, nr. 9.
[13] F.J. Hoogeveen, "Willigen, Johannes van der," ed. P.C. Molhuysen and K.H. Kossmann, vol. 10, Nieuw Nederlandsch Biografisch Woordenboek (Leiden: Sijthoff, 1937), 1218.
[14] Her age can be inferred from the age stated in the town registry after the family had moved to Delft. Archief Delft, "Bevolkingsregister Delft 1839", Wijk 15, blad 8.
[15] 27.01.1818: Dina van der Willigen, 18.04.1819: Samuela van der Willigen, 17.12.1829: Maria Arendina van der Willigen.
[16] On his early retirement see: Hoogeveen, "Willigen, Johannes van der," 1218.
[17] Archief Delft, "Bevolkingsregister Delft 1839", Wijk 15, blad 8.
[18] "Boedeldeling", 13.02.1866, Streekarchief Voorne-Putten en Roozenburg, Notarissen, vol. 110, nr. 115.
[19] "Volumina Inscriptionum 1816-1862", 17.07.1841, Leiden, UBL BC, Archieven van Senaat & Faculteiten, nr. 18.

that he came from Delft. His name does not however appear on the list of pupils of the Latin School of Delft. It is conceivable that he received private schooling, either at home or at a so-called *Fransche School*, a type of secondary school that placed more of an emphasis on practical and applied knowledge than the Latin Schools did.

That might help explain why he enrolled at the Philosophical Faculty in Leiden. This was unusual – he was one of only three students out of a total of 139 that signed up in 1841 who chose this faculty.[20] All the others opted either for the faculty of law, theology, or medicine. It suggests that he already had a strong interest in the natural sciences at this point in his life, because the only place to study all those areas of knowledge associated with the experimental study of nature was the Philosophical Faculty. The range of subjects it covered included physics, mathematics, astronomy, chemistry, botany, natural history, and agronomy.

2. A New Methodology

Van der Willigen's student days coincided with a period of profound change at the University of Leiden. To paraphrase university historian Willem Otterspeer, around 1840 each of the four faculties appointed at least one new professor who essentially shook things up.[21] Arguably the most famous of these was Johann Rudolph Thorbecke at the faculty of law. His name would soon be associated with the new, liberal Dutch constitution he helped draw up in 1848 in response to the wave of democratic protests that swept Europe in that year. But at the Philosophical Faculty, it was the astronomer Frederik Kaiser who introduced some far-reaching changes.

Kaiser had actually been working at Leiden Observatory ever since 1826.[22] He had been a childhood prodigy, and enjoyed little formal training before coming to the Observatory, where he worked as a mere assistant for many years before being awarded an honorary doctorate in 1835. It was only then that his career began to take off, no longer hindered by his total dependence on his direct superior, the professor Petrus Johannes Uylenbroek. One year later Kaiser was appointed director of the Observatory and in 1840, a year before van der Willigen arrived and four years before Uylenbroek passed away, he was given a professorship. Kaiser zealously spent the rest of his long career until his death in 1872 doing everything in his power to take Dutch astronomy to new levels and to make it internationally competitive. His efforts were highly successful, and became physically manifest with the construction of Leiden's very own, state-of-the-art Observatory between 1858 and 1861.

---

[20] *Album Studiosorum, Academiae Lugduno Batavae, 1575-1875, Accedunt Nomina Curatorum et Professorum* (Den Haag: Martinus Nijhoff, 1875), 1325–1328.

[21] Willem Otterspeer, *De werken van de wetenschap: de Leidse universiteit, 1776-1876*, vol. 3, Groepsportret met Dame (Amsterdam: Bert Bakker, 2005), 310–314.

[22] For biographical details on Kaiser see: Huib J. Zuidervaart, "Frederik Kaiser (1808-1872), een gekweld man met een missie," *Studium: tijdschrift voor wetenschaps- en universiteitsgeschiedenis* 4, no. 2 (2011): 62–84.

But Kaiser was not only important to the department of astronomy in Leiden, his impact on Dutch science was far more profound. This had everything to do with the fact that he was an ardent proponent of a new methodology: taking his cue from German astronomer Friedrich Bessel, Kaiser insisted that precise, quantitative measurement should serve as the basis of astronomy.[23] The astronomer's task then lay in the computational and statistical analysis of this data.

This shift in focus of the astronomer's work, away from observation of the skies towards apparently more mundane calculation and number-crunching on the basis of observational data that had been obtained through standardised methods of observation – which could therefore also be obtained by less well-trained observers – was taking place throughout the astronomical community.[24] The Astronomer Royal George Biddell Airy for instance took a similar stance.

The emergence of this new methodological approach coincided with a period of gradual specialisation of the natural sciences, and the rise of disciplinary borders between the specialised communities of researchers. In the Netherlands this was only fully reflected in the organisational structure of the universities long after van der Willigen had completed his studies, after a series of educational reforms in the 1860s and 1870s. However, in the same way that those involved in the (experimental) study of nature in the Anglo-Saxon world began adopting the label "man of science" or even "scientist" as a badge of honour as early as the 1830s, their Dutch counterparts were equally eager to gain recognition of the fact that their field of study was not only expanding rapidly, but also becoming so vast that specialisation was becoming necessary. In an – ultimately unsuccessful - attempt to push through reform of the Dutch universities' rules of examination, the deans of the faculties of philosophy drafted a joint letter suggesting reform, which contained the following key argument:

"The practice of those branches of science associated with Mathematics and Physics [*Natuurkunde*] is increasing more and more, as is, correspondingly, the size of these fields. While as a result some parts of the larger whole increasingly grow closer and need each other's support, the whole of science is in the meantime growing so large that a single person can no longer be familiar with it. On the contrary, because of the nature of the situation, a subdivision is, more and more, urgently required."[25]

[23] On this see: Elly Dekker, "Een procesverbaal van verhoor," *Gewina* 15 (1992): 153–162; and also: Hans Hooijmaijers, "Een passie voor precisie: Frederik Kaiser en het instrumentarium van de Leidse Sterrewacht," *Studium: tijdschrift voor wetenschaps- en universiteitsgeschiedenis* 4, no. 2 (2011): 109.

[24] On the situation in England see for instance: Simon Schaffer, "Astronomers Mark Time: Discipline and the Personal Equation," *Science in Context* 2, no. 1 (1988): 115–145.

[25] "De beoefening der taken van wetenschap welke tot Wis- en Natuurkunde gebragt worden, neemt steeds meer en meer toe, en in dezelfde mate ook de uitgebreidheid van elk deel der wetenschappen hetwelk hiertoe behoort. Terwijl hierdoor sommige deelen van het groote geheel elkander meer en meer naderen, en elkanders hulp behoeven, wordt het geheel intusschen veel te groot, dan dat één mensch daarmede goed vertrouwd zou kunnen worden. Integendeel eene splitsing wordt door den aard der zaak hoe langer hoe meer met dringende noodzaakelijkheid geboden." "Aan Zijne Excellentie den Minister van Binnenlandsche Zaken", 11.03.1842, Leiden, UBL BC, Archieven van Senaat & Faculteiten, nr. 488.

Even more important than this latent dissatisfaction with a lack of formal specialisation within the sciences – certainly as far as van der Willigen was concerned – was the fact that Kaiser's methodological approach began to affect other areas of science as well. Physicists in particular began to apply these methods, pioneered by their close colleagues the astronomers, to their own research. It has been shown that almost all the main proponents of quantitative methods in physics in Germany and the Netherlands during the 19th century were strongly influenced by what Bessel (in Germany) and Kaiser (in the Netherlands) had initiated in astronomy.[26] In many cases, they had received some training in astronomy as part of their scientific education, before specialising in physics.

This brings us back to the future physicist van der Willigen. All evidence suggests that Kaiser was a good teacher, and van der Willigen evidently was impressed and enamoured with this energetic young professor's groundbreaking ideas.[27] Inspired by Kaiser, van der Willigen adopted the same approach to all of his scientific studies throughout his career, i.e. insisting that precise, quantitative measurements could serve as the only basis for any legitimate claim in physics. As such, he provided an important and largely overlooked contribution to the development of physics in the Netherlands. His impact becomes tangible through his own pupil and acolyte Johannes Bosscha, who has been identified as one of the pioneers of experimental physics in the Netherlands alongside Herman Haga and Heike Kamerlingh Onnes.[28] Bosscha's interest in scientific instruments and the precision that could be achieved with them is sure to have been rooted at least to some extent in the classes given by van der Willigen which he attended.

The two first met shortly after van der Willigen had completed his studies in Leiden. He graduated with a final dissertation on the aberration of light, in which he discussed the theories of Stokes and Challis.[29] He had chosen Kaiser as his supervisor. He graduated in 1847 with the highest distinction (magna cum laude), which was exceptional.[30] That same year he received a job as a teacher of physics at the Latin School in Amsterdam – which Bosscha attended.

---

[26] Frans van Lunteren, "'Van meten tot weten': De opkomst der experimentele fysica aan de Nederlandse universiteiten in de negentiende eeuw," *Gewina* 18, no. 2 (1995): 102–138.

[27] On Kaiser as a teacher see: Zuidervaart, "Frederik Kaiser (1808-1872), een gekweld man met een missie," 72–73. On the impression he made on his student van der Willigen see: Hendricus Gerardus van de Bakhuyzen, "Nekrolog: Volkert Simon Maarten van der Willigen," *Vierteljahrsschrift der astronomischen Gesellschaft* 14 (1879): 98. Van der Sande Bakhuyzen also mentions other teachers (Verdam and Uylenbroek), but singles out Kaiser as having impressed van der Willigen the most. For a specific example in which van der Willigen acknowledges that he was strongly influenced by Kaiser's methodology see: Willigen, "Mémoire sur la détermination des indices de réfraction et sur la dispersion des mélanges d'acide sulfurique et d'eau," 75.

[28] On Bosscha's reputation as a pioneer and his interest in instruments and precise measurements see: Lunteren, "'Van meten tot weten': De opkomst der experimentele fysica aan de Nederlandse universiteiten in de negentiende eeuw," 73 & 54; Bastiaan Willink, *De tweede Gouden Eeuw: Nederland en de Nobelprijzen voor natuurwetenschappen, 1870-1940* (Amsterdam: Bert Bakker, 1998), 30.

[29] Volkert Simon Maarten van der Willigen, *Dissertatio inauguralis de aberratione lucis* (Leiden: C.G. Menzel, 1847).

[30] On his final graduation see: "Catalogus candidatorum qui gradum adepti sunt 1813-1850", 1847, UBL BC, Archieven van Senaat en Faculteiten, nr. 351, fol. 329-330.

Van der Willigen did not stay in Amsterdam for long. In 1848 he was offered a professorship in physics, mathematics and speculative philosophy (*bespiegelende wijsbegeerte*) at the Athenaeum in Deventer, which he accepted. Tellingly, Bosscha followed him to the new institution.

3. The Athenaeum in Deventer

As far as van der Willigen was concerned, he most probably only saw his professorship at the Athenaeum in Deventer as an intermediate step in his career. Although he could now carry the title of professor and his position did not preclude his being accepted in the highest circles of the Dutch physics community – he was elected a member of the highly exclusive Dutch Royal Academy (*Koninklijke Nederlandse Akademie van Wetenschappen, KNAW*) in 1857 for instance – a professorship at a university would have been far more prestigious. By the 19th century, both the town of Deventer and its Athenaeum were in fact on the decline. Deventer had been a major Dutch port in the late middle ages, but had since been overtaken by other cities. The Athenaeum had once been one of Holland's finest academic institutions, but by the 19th century, in a move that gives a sense of how a position in Deventer was ranked in relation to comparable positions at a university, at least one of van der Willigen's teachers, Pieter Johannes Uylenbroek, had turned down a professorship in Deventer in 1822 and chosen to become a "mere" lecturer (*Lektor*) at the University of Leiden instead. Three other physicists are known to have moved on to a professorship at the University of Groningen from Deventer.[31]

But despite all this, the chair for mathematics and physics and speculative philosophy to which van der Willigen was appointed was probably the most prestigious academic post Deventer had to offer, for one very simple yet for van der Willigen most likely even crucial reason: the holder of this chair had access to a comparatively well-equipped collection of scientific instruments. This collection had been acquired over a period of about 30 years by the Deventer Society for Physics and Chemistry (*Natuur- en Scheikundig Genootschap*), an amateur learned society.[32] Essentially its cooperation with the Athenaeum and particularly with the holder of the chair in physics, mathematics and speculative philosophy constituted a sort of public-private partnership: instruments were acquired with the Society's funds, but placed at the disposal of the physics professor, as well as any members who showed an interest. This construction was inspired by a similar cooperative venture in Utrecht.

[31] Carel de Goeij, "Het Deventer Natuur- en Scheikundig Genootschap en de opleving van de natuurwetenschap in Nederland in de tweede helft van de negentiende eeuw," in *Deventer jaarboek*, vol. 19 (Nieuwegein: Arko, 1993), 29–30.

[32] On the Society's history see: Goeij, "Het Deventer Natuur- en Scheikundig Genootschap en de opleving van de natuurwetenschap in Nederland in de tweede helft van de negentiende eeuw."

What's more, van der Willigen had surely also heard of the fact that a small observatory had been installed in one of the towers of the town fortifications in the 1839 and was equipped with some of the Society's instruments.[33]

In fact the collection of instruments that now fell under van der Willigen's purview appears to have been the Athenaeum's pride: when it was criticised by a government committee charged with inspections of educational institutions in 1849, articles that were published by the Athenaeum in order to refute the committee's criticism contained frequent references to this collection. And just a year earlier, the year in which van der Willigen was appointed, the Athenaeum's curators had proudly stated:

"In richness of instruments for some areas of Physics [*Natuurkunde*], in particular as far as modern machines are concerned, this collection can compete with larger institutions. It is housed in good order in the fine building of the Athenaeum."[34]

Given the knack for precise measurement he displayed throughout the rest of his career, it is highly plausible that van der Willigen came to Deventer in the hope of being able to perform more and better experimental research there than he might have been able to do at other, comparable, but less well equipped institutions.

4. Amateurs, Specialists and True Physics

Having taken up his new position at the Athenaeum, van der Willigen now found himself in a position of authority for the first time in his young career. It is of course interesting to see how he used the room to manoeuvre he was given, and more importantly to address the question of what this tells us about his own views on the overall role of science. What purpose could it serve and what defined good research, in his opinion?

Two features that characterised van der Willigen's work at Deventer stand out in this respect. The first of these has already been mentioned repeatedly: his steadfast belief that precise, quantitative measurement was the only legitimate path to an incontrovertible body of physics. The second feature is perhaps more surprising, but in some sense also related to the first: his unprecedentedly clear distinction between specialists and amateurs in physics.

[33] Ibid., 25 & 27.
[34] "In rijkdom van werktuigen voor sommige deelen der Natuurkunde, vooral wat nieuwere werktuigen aangaat, kan deze verzameling met grootere inrigtingen wedijveren. Zij is ook in het fraaye gebouw van het Athenaeum in goede orde geplaatst." As quoted in: Ibid., 30.

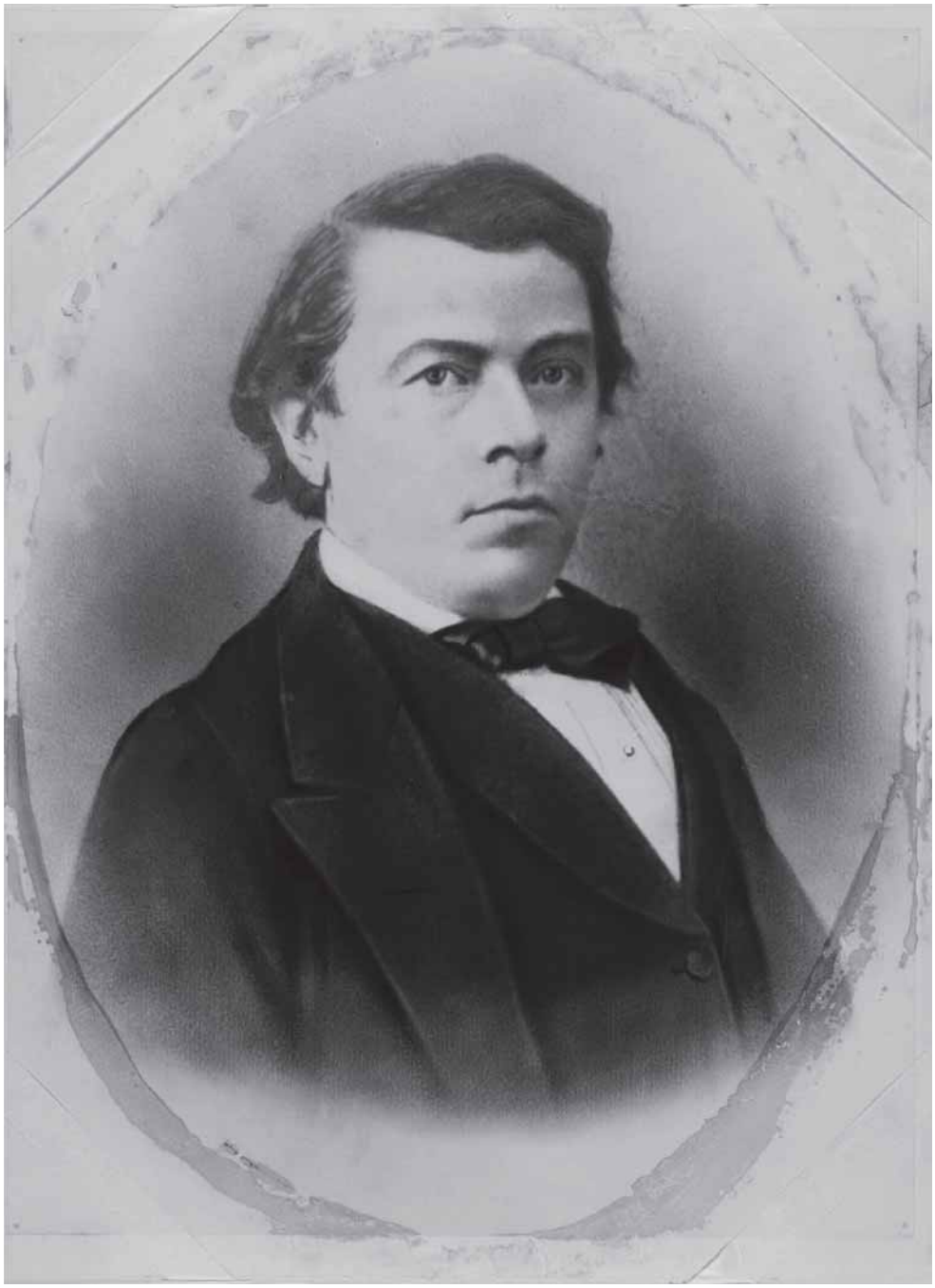

Fig.6. Volkert Simon Maarten van der Willigen (1822-1878), c. 1860
(Teylers Museum, Haarlem, FF010)

Both these points can be deduced from a variety of instances. The most revealing of these is van der Willigen's inaugural lecture at Deventer.[35] This is perhaps the clearest synopsis of his own view of the field of study he had chosen to devote his career to. Interestingly, it reads almost like a positivist's credo. The lecture is suffused with statements such as "observation precedes and theory follows".[36] What's more, van der Willigen repeatedly stresses the point that "observation is more than superficial examination; it implies precision;"[37] He repeatedly stresses that this "precision" can be achieved only through a mathematical formulation of what was observed, and the subsequent statistical analysis of the data gathered through observation. As he phrases it: "All results of observations, whatever they refer to, can be represented as measures and numbers."[38] Statistical evaluation was then necessary in order to avoid or minimize any sources of error, particularly those effected by the observer himself. As van der Willigen lamented: "The first source of disturbance, the influence of which can never be eliminated, is the observer himself", although he pointed out that one had to be equally wary of an instrument's imprecision.[39]

Although Kaiser is not mentioned by name, his influence on van der Willigen clearly transpires from this inaugural lecture, certainly if one bears in mind that it had been only a year since van der Willigen had left Leiden. The new professor left no doubt as to how much more sophisticated he considered astronomy to be in comparison with physics. He was in no doubt as to the reason for astronomy's superiority, either: "it is certain, that greater precision in the observations was the first cause of this vigorous development of astronomy."[40] In embracing statistics as the means to dispense with imprecision, he was emulating Kaiser's methodology.

Another remarkable aspect to van der Willigen's inaugural lecture was how he defined his role with regard to his students. In his opinion, his task was to train researchers, capable of their own meaningful contribution to physics. His idea was that "all *education* has to end in *training for research* and all *practice of science* results in *research*."[41] This was in stark contrast with the humanist ideals held by a large majority of van der Willigen's colleagues in similar positions throughout the Netherlands, according to which they defined their task as building their students' character – what subject they taught was actually only of secondary importance. It was only towards the end of the century that a majority of Dutch physics

[35] Volkert Simon Maarten van der Willigen, *Over natuur- en sterrekundig onderzoek: redevoering bij de plegtige aanvaarding van het hoogleeraarsambt in de wis- en natuurkunde en de bespiegelende wijsbegeerte aan de doorluchte school te Deventer, op Maandag den 16 October 1848, in de gehoorzaal van het Athenaeum uitgesproken* (Deventer: J. de Lange, 1848).
[36] "waarneming gaat vooraf en theorie volgt"; Ibid., 36.
[37] "waarneming is meer dan eene oppervlakkige beschouwing; zij sluit naauwkeurigheid in zich;" Ibid., 13.
[38] "Alle uitkomsten van waarnemingen nu, wáártoe zij ook betrekking hebben, kunnen in maat en getal worden voorgesteld." Ibid., 22.
[39] "Als eerste bron van stoornis, die nimmer haren invloed zal missen, komt de waarnemer zelf in aanmerking"; Ibid., 14 & 17.
[40] "het is toch zeker, dat grooter nauwkeurigheid in de waarnemingen de eerste oorzaak van die krachtiger ontwikkeling der sterrekunde was." Ibid., 36.
[41] "toch alle *onderwijs* in *opleiding tot onderzoek* moet eindigen en alle *beoefening* in *onderzoek* opgaat." Ibid., 9.

professors would have agreed with what van der Willigen was propagating in 1848, i.e. that their task was to train physicists.[42]

With regard to his ideas on the propagation of knowledge, van der Willigen's views become discernible through two other occurrences at Deventer. The first is his curt rebuttal of an invitation to teach mathematics at the former Latin School of Deventer that had just been converted into a Gymnasium. Van der Willigen stated that he would consider this a "loss of time through this insipid and monotonous work."[43] Significantly, however, he did accept a position as one of the three curators of the school. Unsurprisingly, this was far more prestigious a post: the curators were essentially in charge of the school's daily running. Even the Gymnasium's director was effectively no more than an administrator who had to report to the curators.[44]

Status was evidently important to van der Willigen, a character trait that helps explain the way he handled the members of the amateur society for chemistry and physics. He was not as dismissive of them as he was of the idea of teaching mathematics at the Gymnasium. On the contrary, he seemed to embrace them and signalled his willingness to meet the members' thirst for knowledge through his willingness to hold regular lectures on physics and astronomy. What's more, he insisted that more listeners than before should be able to attend these lectures.[45] He even insisted that women be allowed to attend these lectures too, which was not self-evident at the time.[46] No precise numbers of attendance are given, but a note from the minutes of the Society that was struck out suggests that van der Willigen had an audience of about 30 in mind.[47] He appears to have been an engaging lecturer too. After the first one he gave in 1848, the minutes of the Society's meetings at least read:

"The first mixed meeting that was organised can be called successful. A considerable group of ladies, members and guests had arrived and followed the speaker in his disquisition on the Moon with undivided attention and great interest."[48]

Van der Willigen's commitment did not wane over the years, either. Upon leaving Deventer in 1865 to take up his post as curator in Haarlem he was made an honorary member of the

[42] Lunteren, "'Van meten tot weten': De opkomst der experimentele fysica aan de Nederlandse universiteiten in de negentiende eeuw," 115 & 134.
[43] "verlies van tijd aan dien insipide en geestdoodenden arbeid." As quoted in: Goeij, "Het Deventer Natuur- en Scheikundig Genootschap en de opleving van de natuurwetenschap in Nederland in de tweede helft van de negentiende eeuw," 30.
[44] On the history of this Gymnasium and its organisational structure see: G.J. ter Kuile and J. Stam, *Stedelijk Gymnasium te Deventer 1848-1948: Gedenkboek* (Deventer: Stedelijk Gymnasium, 1948).
[45] "Notulen Natuur- en Scheikundig Genootschap 1817-1853", 05.10.1848, Archief Deventer, ID972, nr. 1.
[46] Bakhuyzen, "Nekrolog: Volkert Simon Maarten van der Willigen," 98. Van de Sande Bakhuyzen's phrasing suggests van der Willigen held separate lectures for women, but the quote from the Deventer Society's meeting on 26.10.1848 given below suggests van der Willigen's lectures were attended by both men and women, and only after he started giving them.
[47] "Notulen Natuur- en Scheikundig Genootschap 1817-1853", 05.10.1848, Archief Deventer, ID972, nr. 1.
[48] "De eerste proeve van eene gemengde vergadering mogt gelukkig heeten. Eene aanzienlijke schaar van dames, leden en gasten was opgekomen en volgde met ongedeelte [unreadable: ongedeelde?] aandacht en groote belangstelling den spreker in zijne beschouwing van de Maan." "Notulen Natuur- en Scheikundig Genootschap 1817-1853", 26.10.1848, Archief Deventer, ID972, nr. 1.

Society "because of his exceptional assiduity and the interest shown by him in the Society over a number of years".[49]

Through his involvement and by holding lectures, van der Willigen proved he was serious about something he had professed towards the end of his inaugural lecture:

"What was obtained with indefatigable endeavour by few, belongs to *everybody* and is a *common* good; and it is a bounden duty of the practitioners of science, to make everybody share in these results. What has been learnt through research, must be spread and made known; then the material world and creation will contribute abundantly to development and education, to enlightenment and civilisation. Thus every opportunity that offers itself to cultivate true and pure knowledge of nature among you, shall find me disposed to work to that purpose according to my ability."[50]

One such "opportunity" were of course his lectures at the Society. But while the young professor was obviously not loth to let others participate and profit from the fruits of his and others' research, it is also worth noting the distinction he makes between "practitioners of science" and "everybody". This is crucial: a number of examples in fact indicate how van der Willigen was of the opinion that while untrained amateurs were welcome to act as the recipients of knowledge handed down to them by specialised researchers, they should not think that they were capable of participating in the actual research process, and should not imagine that they were on an equal footing with trained researchers. In this sense, he did have a certain disdain for the members of the Society. This makes it all the more significant that he clearly stated in his inaugural lecture how he thought one of the reasons astronomy was ahead of physics was that it was free of the meddling influence of amateurs, or to use van der Willigen's term, "een ieder". The passage is worth quoting in full:

"Astronomical observations were always further beyond the reach of many people and require special application; striking physics experiments on the other hand are within the range of everybody. While a wide field of study and contemplation remains, many occupy themselves with experiments and try to make discoveries; they produce imprecise observations, where the most perfect ones are required, and incorrect assumptions, which require new study to destroy them; in this way they imagine they render excellent services to science. And as a result those

[49] "uit aanmerking van den buitengewonen ijver van en de belangstelling door Zijn Hooggel. gedurende een reeks van jaren in het Genootschap behoord"; "Notulen Natuur- en Scheikundig Genootschap 1853-1908", 05.10.1865, Archief Deventer, ID972, nr. 2.

[50] "Hetgeen door onvermoeid streven van weinigen erlangd werd, behoort *allen* en is *algemeen* goed; en het is een dure pligt van de beoefenaars der wetenschap, een ieder daarin te doen deelen. Wat onderzoek leerde, moet worden verspreid en gekend; dan zal ook de stoffelijke schepping rijkelijk het hare toebrengen tot ontwikkeling en vorming, tot verlichting en beschaving. Zoo zal dan ook elke gelegenheid, die zich aanbiedt, om ware en zuivere kennis der natuur onder U te kweeken, mij bereid vinden, om, naar mijne krachten, ook hieraan te arbeiden." Willigen, *Over natuur- en sterrekundig onderzoek: redevoering bij de plegtige aanvaarding van het hoogleeraarsambt in de wis- en natuurkunde en de bespiegelende wijsbegeerte aan de doorluchte school te Deventer, op Maandag den 16 October 1848, in de gehoorzaal van het Athenaeum uitgesproken*, 43–44.

inaccuracies and superficial determinations and all those explanations creep in, under the burden of which science is weighed down."[51]

It is even conceivable that this was a subtle but programmatic statement aimed at any members of the Society who happened to be in the audience. Because – even though there is no reason to assume van der Willigen did not give his lectures at the Society with the best of intentions – they did mark a break with the past in the sense that during the previous decades of the Society's existence, any member had – in principle – been allowed to give presentations on any topic or recent finding deemed interesting.[52] By effectively monopolising the right to hold these lectures (although he shared this duty together with his colleague who held the chair for chemistry), van der Willigen was relegating the members to the status of mere recipients of knowledge that he – the expert – would break down and "diffuse" for them. This reflected the growing status of science, and by extension the status claimed by and accorded to researchers – "scientists" – such as van der Willigen.

At this point it is worth noting too, however, that van der Willigen's penchant for precise measurement and his clear distinction between trained, specialised researchers on the one hand and amateurs on the other hand did not go uncontested. His contemporary Christophorus Henricus Didericus Buys Ballot, a professor of mathematics at the University of Utrecht, was a particularly outspoken opponent. The origins to the two men's dispute again lay in van der Willigen's inaugural lecture: in order to illustrate how important precise measurement was to serious research van der Willigen had referred to studies of the earth's atmosphere as an example of the gathering of data that would not be of much use because it was imprecise and would yield little more than qualitative results. Buys Ballot however took this as a personal attack on his research efforts – most likely this was not unjustified – and published a rebuke in the popular weekly magazine *Algemene Konst- en Letterbode*.[53] Interestingly, in the same way that van der Willigen was basically helping define a methodology that in turn defined physics, Buys Ballot was at the time in the process of establishing meteorology as a fully fledged science.[54] To this end he was in the process of constructing an immense, "Humboldtian", network of observers – which explicitly included amateurs. In fact, his rebuke to van der Willigen was delivered in an article in which he called upon those amateurs to provide him with as many measurements as possible. He was convinced that absolute measurements were not needed to establish a margin of errors in his measurements, but that

[51] "Sterrekundige waarnemingen waren te allen tijde meer boven het bereik van velen verheven en vorderen bijzonderen toeleg; treffende natuurkundige proeven daarentegen vallen binnen den kring van een ieder. Terwijl nu nog een ruim veld van onderzoek en bespiegeling overblijft, houden velen zich met proefnemingen bezig en gaan op ontdekkingen uit; zij leveren onnauwkeurige waarnemingen, waar reeds de volkomenste worden gevorderd, en valsche onderstellingen, die tot hare vernietiging nieuw onderzoek eischen; zoo wanen zij der wetenschap uitstekende diensten te bewijzen. En hierdoor sluipen dan die onjuistheden en oppervlakkige bepalingen en al die verklaringen binnen, onder wier last de wetenschap gebukt gaat." Ibid., 37.

[52] Goeij, "Het Deventer Natuur- en Scheikundig Genootschap en de opleving van de natuurwetenschap in Nederland in de tweede helft van de negentiende eeuw," 31–32.

[53] Christopherus Henricus Didericus Buys Ballot, "Sterre- en Weerkundige Waarnemingen: Iets over de Meteorologische Waarnemingen aan het Observatorium te Utrecht," *Algemeene Konst- en Letterbode*, August 12, 1848.

[54] On this see: Frans van Lunteren, "Geinstitutionaliseerde deskundigheid: Buys Ballot en het KNMI," in *De opmars van deskundigen: Souffleurs van de samenleving*, ed. Frans van Lunteren, Bert Theunissen, and Rienk Vermij (Amsterdam: Amsterdam University Press, 2002), 59–74.

relative values were sufficient for what he sought to achieve. As he said some years after his public exchange with van der Willigen, he considered it "infinitely better to make simple observations in a hundred places, not too far from each other, than very complete ones in ten places."[55]

Yet despite this small but nasty public feud, both men continued unperturbed. Van der Willigen could not resist a jibe at his detractor before the members of the Deventer Society in 1851, stating that meteorology was "more of a descriptive than an explanatory science, closer to geography than to physics".[56]

Van der Willigen remained in Deventer for the better part of 16 years – after which he was appointed curator at Teylers. Notable and formative events during these years include his marriage in 1856 (when he died suddenly in 1878 he left his widow with six children) and, as was already mentioned, his being elected a member of the Dutch Royal Academy. Whatever time he had van der Willigen devoted to research – although he complained at least once that the equipment and facilities at his disposal were actually insufficient.[57] But he evidently overcame such restrictions and busied himself with a variety of research projects. In 1852 for instance he established Deventer's exact latitude by taking a series of measurements at the observatory that had been installed in a tower of the town's former fortifications. This resulted in the publication of a small booklet with his findings.[58] Between 1857 and 1859 he published a series of articles in the Dutch Royal Academy's Journal on spectrographic research he had performed on light that was created through the discharge that occurs between two electrodes in a variety of gases. This research in turn allowed him to develop methods of testing the quality of materials on the basis of spectrography. He was able to establish whether solutions of soluble bases contained any contamination from other materials. His research on electric discharge also led him to cooperate with Friedrich Wilhelm Florenz Geissler – the brother of Heinrich – and van der Willigen suggested to him that he introduce platinum wires into the Torricellian vacuum tube of a barometer, sealing off the junctions and thereby producing "the best possible vacuum known at the time".[59] According to van de Sande Bakhuyzen, van der Willigen became disheartened with this line of research after Fraunhofer and Bunsen had published far more precise results on the same topic, and spent his last years in Deventer performing small-scale experiments related to electricity and the interference and diffraction of light.

By this time, major change was looming on the horizon. More specifically, the year 1863 saw a substantial reform of the Dutch education system. Following suggestions by the first minister Rudolf Thorbecke – the former professor of law in Leiden who had already been first

55 "oneindig beter op honderd plaatsen, niet te ver van elkander, eenvoudige waarnemingen te doen, dan op tien plaatsen hoogst volledige." As quoted in: Ibid., 63.
56 "meer beschrijvende wetenschap dan verklarende, dichter bij geografie dan bij physica"; "Notulen Natuur- en Scheikundig Genootschap 1853-1908", 06.11.1861, Archief Deventer, ID972, nr. 1.
57 See the introductory remarks to: Volkert Simon Maarten van der Willigen, *Bepaling der poolshoogte voor Deventer* (Deventer: J. de Lange, 1852). I am grateful to Marijn van Hoorn for having drawn my attention to this publication.
58 Ibid.
59 Karl Eichhorn, "Heinrich Geissler (1814-1879): His Life, Times and Work," *Bulletin of the Scientific Instrument Society* 27 (1990): 19.

minister once before in the 1840s – a new type of school was introduced, the so-called *Hogere Burgerschool* (HBS).[60] In contrast to the traditional *Gymnasium*, the HBS focused on the skills required in science and engineering, as well as modern languages. The idea was to train graduates for a career in trade or industry. Every HBS was therefore also required to have a fully equipped laboratory for training purposes. Although graduates of the HBS would have been the same age as those leaving the G*ymnasium*, this new type of school was initially accorded a far lower status. Only graduates of the *Gymnasium* were qualified to attend university. Those that had completed their schooling at a HBS could only move on to an engineering school in Delft. By the time a disproportionately high amount of Dutch scientists were awarded a Nobel Prize at the beginning of the 20th century, however, the reforms of 1864 and therefore by extension also the HBS were considered one of the major factors that had helped bring about the successes of what has been referred to as the "Second Golden Age".

This was of course not foreseeable in 1864 yet. As far as van der Willigen was concerned, the establishment of a HBS in Deventer had a far more immediate impact: The scientific branch of the Athenaeum was separated from its other departments and reorganised to form the core of the town's first HBS. The Athenaeum itself was even dissolved in 1878.[61] Needless to say, these changes would have had a profound effect on van der Willigen's position – had he not left just as they were being implemented. It so happened that in that very same year, Martinus van Marum's successor at Teylers Museum, Jacob Gijsbert Samuël van Breda, resigned from his post in Haarlem, creating a vacancy van der Willigen must only have been too glad to fill.

III. The Art of Presenting

1. The Rise of Public Art Exhibitions

Strictly speaking, van der Willigen was not van Breda's successor. Van Breda had been in charge of all the museum's scientific collections, i.e. the instrument collection and the geological collection. After his departure in 1864, however, it was decided to entrust two curators with these collections: one curator of physics, and one of geology. Van der Willigen therefore only took over a part of van Breda's duties. His official title upon being appointed in January 1865 was "Director of the Physics Cabinet of the Teyler Foundation".[62]

[60] On the HBS and its position within the Dutch system of education see: Willink, *De tweede Gouden Eeuw: Nederland en de Nobelprijzen voor natuurwetenschappen, 1870-1940*, 27.
[61] On this see: Jacob Cornelis van Slee, *De Illustre School te Deventer 1630-1878: hare geschiedenis, hoogleeraren en studenten, met bijvoeging van het Album Studiosorum* (s'Gravenhage: Nijhoff, 1916).
[62] "Directienotulen", 20.01.1865, Haarlem, ATS, vol. 9. A draft version of his contract (instructions) was approved at this meeting.

First and foremost this development reflects the way the sciences had specialised since van Marum's times and also how the museum's collections had continually expanded over the years. It was clearly considered too much to ask one expert to cover both areas of research and look after the collections to any meaningful degree; and according to the contract that was drawn up for van der Willigen, looking after the collections and performing research were his most important tasks at Teylers.[63] Besides keeping a tidy inventory of the collection and accompanying "foreigners of distinction, or famous scientists, who apply for a visit or investigation of objects in the collection under his purview", all that was essentially asked of him in return was to give "four to six lectures […] on topics concerning the physical sciences" during the winter before a small audience consisting of the trustees, the members of Teylers Learned Societies and a select number of other guests.

At the same time, however, the fact that both van der Willigen and a curator of geology were taken on to replace van Breda (the geology department fell under the purview of Tiberius Cornelis Winkler) is indicative of another development that came to shape Teylers Museum and is important to take into account when assessing the state of the museum upon van der Willigen's arrival: the art collection was beginning to take centre stage at Teylers Museum. Put differently, Teylers Museum was increasingly perceived as a public art museum.

In contrast to van Marum's times it was therefore also the curator of the fine art collection who gradually took on more responsibilities for the museum as a whole. Van der Willigen's contract stated that the only person he had to answer to was the one trustee of the Teyler Foundation who had been chosen amongst the five to deal with all matters relating to the scientific collections – so the art curator did not act as head of the museum; yet it is not insignificant that, when all three curators and the librarian were required to submit annual reports to the trustees after 1876, it was the curator of the art collection who included visitor numbers in his report. Clearly, he was acting as the trustees' main contact for all matters regarding the museum's role as a public institution.

Throughout van der Willigen's tenure at Teylers the curator of the museum's collection of fine art was Hendrik Jacobus Scholten. He had arrived about a year before van der Willigen and Winkler, in October 1863.[64] Like all of his predecessors, he too was a painter by training and continued to paint while working for the Teyler Foundation.[65] He had come to Haarlem to replace Adrianus Johannes Ehnle, who had died unexpectedly in April of the same year, after only having spent the better part of seven years at the museum.[66] Ehnle, in turn, had replaced

[63] Below: "vreemdelingen van aanzien, of beroemde geleerden, die zich tot bezigtiging of onderzoek der voorwerpen inde verzameling onder zijn bestuur aanmelden"; "vier à zes voorlezingen […] over onderwerpen de natuurkundige wetenschappen betreffende"; Ibid.
[64] "Directienotulen", 10.07.1863, Haarlem, ATS, vol. 9.
[65] For a short summary of Scholten's life and work see: Pieter A. Scheen, *Lexicon Nederlandse Beeldende Kunstenaars 1750-1950*, vol. 2 ('s-Gravenhage: Pieter A. Scheen, 1994), 314. However, Scheen wrongly states that Scholten arrived in Haarlem in 1872.
[66] On his appointment see: "Directienotulen", 24.10.1856, Haarlem, ATS, vol. 9. On his death see: "Directienotulen", 17.04.1863, Haarlem, ATS, vol. 9. He died on 04.04.1863.

the ailing, 80-year old Michaëlis.[67] Scholten outlived both of his fellow new arrivals at the museum and passed away in 1907, at age 82.

To some extent the fact that Teylers Museum was increasingly perceived as an art museum can be seen as the result of the trend that was already described in the introductory section to this chapter, i.e. the increasing incomprehensibility and inaccessibility of scientific research to laypeople, which in turn led to a gradual removal of science from the public domain. This meant visitors would inevitably have focused more on that part of the museum which they found comprehensible, i.e. the display of fine art. But what is just as important – and only served to enhance this trend – is that at the very same time art exhibitions and public museums were increasingly taking on a role as core constitutive elements of the overall fabric of public life.

It was already mentioned in the previous chapter that collecting paintings by contemporary artists became fashionable in the early 19th century; presumably as a result, the 1830s and even more so the 1840s saw a significant increase in the amount of public art exhibitions held in the Netherlands. Whereas, on average, about one exhibition per year with works of art by contemporary artists from all over the Netherlands had been held in the aftermath of the first art exhibition organised by Louis Napoleon in 1808, avid art lovers could have attended about two every year between 1830 and 1840 and a total of 32 such exhibitions between 1840 and 1850.[68] Interestingly, some of these exhibitions were purely commercial, i.e. had the express purpose of attracting custom for painters, whereas others were organised or at least coordinated with the help of the government.[69] The aim of the exhibitions in which the government was involved was more educational in nature, i.e. to provide the public with an opportunity to keep abreast of the newest developments in the art world.[70] These exhibitions thereby inevitably also provided a benchmark for taste, and could serve to inspire other artists.

In addition to these temporary exhibitions of contemporary paintings, permanent public displays of works by living artists were becoming more common too. The first such exhibition was actually the display of the Teyler Foundation's collection of paintings at Teylers Museum after 1826 – although this only took on serious proportions upon the completion of the First Art Gallery in 1839. Even if it was not huge, the Gallery at Teylers Museum did not have to fear comparison with the venues where the official (i.e. non-commercial) temporary exhibitions were held, such as for example the premises of the Academy of Arts in The Hague.[71]

But that very same year also saw the transferral of all paintings by contemporary artists from the collection of the Rijksmuseum in Amsterdam – where up until then they had been on display alongside all the other paintings at the *Trippenhuis*, a former merchant's house that was also home to the Dutch Royal Academy and is situated on one of Amsterdam's most

[67] "Directienotulen", 24.10.1856, Haarlem, ATS, vol. 9.
[68] Annemieke Hoogenboom, *De stand des kunstenaars: de positie van kunstschilders in Nederland in de eerste helft van de negentiende eeuw* (Leiden: Primavera Pers, 1993), 147.
[69] For examples see: Ibid., 142ff.
[70] Ibid., 143.
[71] For a depiction of these premises in 1839 see for instance: Ibid., 82.

prestigious canals – to Haarlem. More specifically, they were put on display at *Paviljoen Welgelegen*, the country manor where the banker Henry Hope had stored his extensive art collection at the end of the 18th century and which had subsequently served as Louis Napoleon's palace for a few months.[72] This choice of venue was later mocked as having arisen from purely financial considerations and not being at all suitable for an appropriate hanging of the pictures on display, and they were returned to Amsterdam in 1885.[73] Nevertheless, after 1839 the town of Haarlem was home to two permanent, public museums of contemporary art.

So around the middle of the 19th century both temporary and permanent displays of contemporary art were in no way out of the ordinary. Exhibitions were no longer the reserve of large towns either, with many of the temporary ones being held in smaller towns too. In 1849 for instance one of the first provincial museums of the Netherlands opened in Dordrecht and was dedicated to works of living local artists.[74]

It is worth noting that the rising popularity of art exhibitions coincided with a change in status of the artist's profession. The most pertinent symbol of these changes was the setting up of a monumental statue to Rembrandt in Amsterdam in 1852. This underscored a romanticised image of him as a genius who had brought fame and glory to the Dutch nation with nothing more than his inspired handling of the paintbrush, canvas and palette. It also ensured this image was spread beyond the artists' community, giving its members a reference point and symbol to rally around.

There were other, less abstract manifestations of a new found confidence amongst artists as well, such as the establishment of artists' associations. *Arti et Amicitiae* in Amsterdam and *Pulchri Studio* in The Hague are the most prominent examples. They were founded in 1839 and 1847 respectively, having evolved out of a series of earlier, less successful societies.[75] Interestingly, both associations maintained premises where they could hold exhibitions of their own, usually featuring the work of members.

---

[72] M.W. Kok, "De musea in Paviljoen Welgelegen," in *Paviljoen Welgelegen 1789-1989: Van buitenplaats van de bankier Hope tot zetel van de provincie Noord-Holland* (Haarlem: Schuyt, 1989), 139–150.

[73] Frederik J. Duparc, *Een eeuw strijd voor Nederlands cultureel erfgoed* (The Hague: Staatsuitgeverij, 1975), 59–60 & 141–143. Despite the apparent inadequacy of the premises, figures provided by Duparc suggest that around 1880 almost three times as many visitors attended the exhibition in the Paviljoen as did Teylers Museum. However, it is questionable just how reliable the available source material on visitor numbers really is.

[74] Hoogenboom, *De stand des kunstenaars: de positie van kunstschilders in Nederland in de eerste helft van de negentiende eeuw*, 88.

[75] Ibid., 22–23. Hoogenboom gives 1848 as the year in which Pulchri Studio was founded on these pages, but 1847 on p. 86.

2. The First Art Gallery, a Permanent Exhibition?

Having now established that art exhibitions had become far more common when van Breda left his post at Teylers than they had been when he arrived, the crucial point is of course to try and understand how the display at the First Art Gallery of Teylers Museum needs to be seen in relation to other publicly accessible exhibitions during this period. What characterised the display at Teylers Museum and therefore, by extension, Teylers Museum itself?

Two points are particularly striking. The first is that it was a privately funded, yet non-profit and publicly accessible museum. As such it differed from the other major exhibitions and museums, because neither was the government or any other public body involved, nor was the exhibition's aim that of making money. What's more, the exhibition at Teylers was permanent. As was already mentioned in the previous chapter, no statements or clues as to exactly what purpose the trustees of the Teyler Foundation saw in presenting their art collection to the general public in such a magnificent manner have been preserved – although one can safely assume that the trustees would have felt their decisions needed to be in accordance with Pieter Teyler's last will and testament. One could therefore perhaps say that the First Art Gallery was the result of personal interest and preferences on the one hand and a tradition of public service in the Mennonite sense on the other hand.

More specifically, on the one hand the collection of paintings itself has an innately private character – no clear principle according to which the paintings were acquired is discernible. The only constant criterion appears to have been that the paintings had to be Dutch. (This argument at least was brought forward in a polite refusal to acquire a painting that had been offered for sale in 1854.[76]) One also can't help but notice that some paintings were bought in pairs, which would have been in line with a fashion coined by collectors of Romantic art.[77] One of the very first acquisition for instance – "*Storm op Zee*" ("Storm at Sea") by Johannes Christiaan Schotel – evidently prompted the trustees to ask the artist to paint another work of equal size depicting a calm sea. Finally, some of the paintings the Foundation acquired had been praised by critics at exhibitions of contemporary art, which would have made them desirable in itself – but not cheaper, and therefore not really suitable as a financial investment either, ruling out another possible motive for acquiring these paintings.[78] So, in all likelihood, it was the trustees' personal taste which formed the main determining factor in selecting new acquisitions.

Yet, on the other hand, the trustees were ultimately not acquiring the paintings for themselves, but for the Teyler Foundation. And not only had Teyler clearly stated that the arts and sciences were to be stimulated with his bequeathal, but Teylers Museum had also had the decade-long tradition of allowing access to whoever was interested in the collections housed

[76] "Directienotulen", 24.02.1854, Haarlem, ATS, vol. 9.
[77] Annemiek Ouwerkerk, *Romantiek aan het Spaarne: schilderijen tot 1850 uit de collectie van Teylers Museum Haarlem* (Haarlem: Teylers Museum, 2010), 49–51.
[78] On the acquisition of works praised by critics see also: Ibid., 25; Terry van Druten, "Waarheid om bij weg te dromen: De Nederlandse Romantiek in Teylers Museum en de Collectie Rademakers," unpublished manuscript (Haarlem, 2013).

there, free of charge. All this would inevitably have had a profound impact on how the trustees handled the Foundation's collection and helps explain why they had the First Art Gallery constructed for such an innately private collection.

This accessibility brings us to the second point that is of crucial importance in understanding the museum's character around the time van der Willigen arrived there: this is the fact that it was not intended to function as a venue for practical studies. Copying the works on display was forbidden – explicitly so after 1852. The minutes of a meeting of the trustees held in July of that year read:

"The question comes up whether the one or the other painter might be allowed to make copies of pieces [paintings] in the Museum of this Foundation. Because of the many inconveniences which would arise from this, it is decided not to grant permission."[79]

Although this was not extraordinary for temporary exhibitions of contemporary art – after all, copies would inevitably also have affected the pictures' market value – this kind of prohibition was not usual at museums. On the contrary: copying the old masters was considered part of every aspiring painter's basic training, and the most suitable place to do so was a museum. In 1906 the painter Jozef Israëls – by then he was more than 80 years old and one of the most respected artists of his generation – recalled how, when he arrived in Amsterdam in the early 1840s, his teacher, Jan Adam Kruseman, had sent him to the Rijksmuseum to make copies – even though Israëls would much rather have copied paintings from his master's private collection. Israëls described this in the following words:

"It was around the middle of the previous century, that I went to Amsterdam to train as a student of the art of painting under the direction of the then renowned portraitist Kruseman. I was soon admitted to the studio of my master and I looked with great admiration at the portraits of distinguished persons in Amsterdam that he was working on.

The pink colour of the complexions and the delicate treatment of fabrics and clothes, sometimes standing out against a background of dark red velvet, pleased me greatly.

However, when I expressed my desire to be allowed to copy some of these portraits, I was not given permission by the master; no, he replied, if you want to make copies, then go to the museum in the *Trippenhuis*."[80]

---

[79] "Komt ter spraak de vraag, of aan deze of gene schilders vergund zou kunnen worden om stukken van het Museum dezer Stichting te kopiëren. Uit hoofde van de vele bezwaren , die daaraan verbonden zijn, wordt besloten, zoodanige vergunning niet te verleenen." "Directienotulen", 30.07.1852, Haarlem, ATS, vol. 9.

[80] "Het was zoo wat tegen de helft der vorige eeuw, dat ik naar Amsterdam ging om als studiosus in de schilderkunst mij onder de leiding van den toen zeer gerenommeerden portretschilder Kruseman te bekwamen. Al spoedig werd ik toegelaten in het atelier van mijn meester en zag met groote bewondering de portretten, die hij naar voorname personen van Amsterdam onder handen had. // De rose kleur der aangezichten en de fijne behandeling der stoffen en kleedage, soms uitkomende tegen een achtergrond van donker rood fluweel behaagden mij zeer. // Toen ik echter het verlangen te kennen gaf eenige dier portretten te mogen copieeren, werd mij dat door den meester niet toegestaan; neen, was zijn antwoord, als gij copieeren wilt, ga dan naar het museum in het Trippenhuis." Jozef Israëls, "Rembrandt," *De Gids* 24, no. 3 (1906): 1–2.

Incidentally, Israëls adds that he was loth to go the Rijksmuseum with its display of old masters because he was far more excited by the works of contemporary, living artists. As he put it:

"The exhibitions at Arti [et Amicitiae] seemed much more beautiful to me, and I admired in particular Pieneman, Gallait, Calame and Koekoek [19th century Dutch painters]."[81]

3. The More Visitors, the More Exclusive?

If those were his criteria, then one can safely assume that he would have enjoyed the display at Teylers Museum too. (He is known to have visited at least once because he signed the visitor's book, although this was some years later, in 1866.[82]) And even if he would not have been allowed to copy the paintings that hung there, he would still have been very welcome. At any rate there is nothing that indicates that the Teyler Foundation's trustees did not embrace the public and welcome any interest in the museum's collections. On the contrary, in 1845 for instance Teylers Museum's opening hours were changed so as not to coincide with the times during which the famous cathedral organ was demonstrated, so that visitors to Haarlem could enjoy both of these attractions.[83] Even before this measure was taken visitor numbers had been rising steadily for some time, so that in 1836 the ailing van Marum had even asked the trustees to set up a new rule that tickets to the museum could only be obtained early in the morning, "in order to discourage to some extent the all too great influx of persons wanting to visit Teylers Museum".[84] The amount of visitors did not go down after 1840 – on the contrary, noticeably more artists, presumably attracted by the newly opened First Art Gallery, signed the visitor's book.[85]

What's more, over the course of the subsequent decades the trustees never hesitated to enable the members of other Learned Societies or professional associations to visit the museum. In 1861 they even briefly took on an "additional servant […] to help with the supervision", after having agreed to open the museum every day for a whole week in July, while the Dutch national arts and crafts fair was being held in Haarlem.[86] Other examples for requests that

[81] "Mij kwamen de tentoonstellingen op Arti veel mooier voor en ik bewonderde vooral Pieneman, Gallait, Calame en Koekoek." Ibid., 2.
[82] Janse, "Uit nieuwsgierigheid en ter onderricht," 19.
[83] "Directienotulen", 11.07.1845, Haarlem, ATS, vol. 8.
[84] "om den al te grooten toevloed van personen ter bezigtiging van Teylers Museum, eenigermate tegen te gaan"; "Directienotulen", 08.07.1836, Haarlem, ATS, vol. 8.
[85] Janse, "Uit nieuwsgierigheid en ter onderricht," 19. During this period some visitors may also have been attracted by the fact that J.G.S. van Breda was appointed as van Marum's successor in 1839. He evidently continued the tradition of letting visitors sign the visitor's book – although he did not do so at the Holland Society, where, just like van Marum, he was put in charge of the natural history. Incidentally, in the years after van Breda's departure in 1864 there is a sharp decline in signatures in the visitor's book at Teylers Museum, although this picks up again in the late 1870s.
[86] "extra-bediende […] om mede toezigt te houden"; "Directienotulen", 15.03.1861 & 07.06.1861, Haarlem, ATS, vol. 9.

were readily granted include ones by the Haarlem section of the Society for the Abolition of Strong Liquor (*Maatschappij tot afschaffing van den sterken drank*) in 1858 and 1867, the Haarlem section of the Dutch Society for the Advancement of Medicine (*Nederlandsche Maatschappij tot Bevordering van Geneeskunde*) in 1855, or the Dutch Agrarian Society (*Hollandsche Maatschappij van Landbouw*) in 1863.[87] The latter had organised the national agrarian exhibition in Haarlem in that year. In a move that betrays the overall status of women in late 19th century society, the trustees of the Teyler Foundation explicitly noted that members of the Society who wanted to visit the museum "with a lady" were allowed to do so.[88]

But while visitors were obviously welcome, what transpires equally clearly from the trustees' actions is that they considered Teylers Museum a place where visitors were to behave in an orderly, civilised manner. In June 1838 for instance they decided to close the museum for the duration of the annual Haarlem funfair. In doing so they wanted to prevent a repeat of the "far-reaching abuse" they had had to experience the year before.[89] No details of what exactly happened or was damaged were recorded, but the events were evidently traumatic enough for the trustees to continue closing the museum during the funfair period for many years to come.[90] A similar decision was taken in May 1850, when the trustees recorded how they had decided "on the occasion of the big music festival, which will take place here in the City, to grant no access to Teylers Museum", which meant the museum was closed for an entire week.[91]

As the explanation given in 1838 suggests, the trustees' primary – if not even sole – motive in coming to these decisions was most certainly a legitimate concern for the safety of the museum's valuable collections. Their decision to close the museum must therefore not be seen as an expression of some sort of disdain they harboured for laypeople who had not had the privilege of any form of "high-brow" education – as anybody who has ever been in charge of a publicly accessible collection can tell you, valuable, unique objects on the one hand and as large as possible a crowd of people from all walks of life on the other hand are not necessarily a match made in heaven.

But at the same time the trustees' decision to restrict access to the museum to those whose credentials (such as their membership of a professional association) suggested they could be trusted to behave in a civilised manner, chimes well with a certain aura of exclusivity that public displays of art in particular were beginning to acquire and sometimes even cultivate. Crucially, both by accident and by design, public art exhibitions were becoming places where

[87] "Directienotulen", 04.06.1858 & 02.08.1867 & 25.05.1855 & 13.02.1863, Haarlem, ATS, vol. 9.
[88] "Directienotulen", 13.02.1863, Haarlem, ATS, vol. 9. "Op verzoek van de Commissie voor de in September aanst. hier ter stede te houden algemene Landbouw-tentonstelling, wordt de toegang tot de Musea van T.St. aan de leden der Hollandsche Maatschappij van Landbouw, met eene dame, op vertoon van hun diploma toegestaan, van 24-30 September, van 2-4 ure."
[89] "Directienotulen", 01.06.1838, Haarlem, ATS, vol. 8. "Directeuren, in aanmerking nemende, dat in het vorige jaar, gedurende de Kermis, een verregaand misbruik is gemaakt van de vergunning, ter bezigtiging van het Museum, hebben besloten den gewonen toegang tot hetzelve dit jaar niet te verleenen [...]".
[90] "Directienotulen", 03.05.1839 & 25.06.1841 & 17.06.1842, Haarlem, ATS, vol. 8.
[91] "ter gelegenheid van het groote muziekfeest, 't welk te dezer Stede zal plaats hebben, den toegang tot Teylers Museum niet te verleenen"; "Directienotulen", 31.05.1850, Haarlem, ATS, vol. 9.

visitors could shore up their credentials as fully fledged members of the bourgeoisie through the aesthetic contemplation of works of art in public. Put differently, exhibitions – and by extension, as they were increasingly defined by the public display of their collections, museums too – were turning into places to "see and be seen".

Fig.7. The First Art Gallery depicted by Johan Conrad Greive, 1862
(Teylers Museum, Haarlem, DD042d)

At this point it is necessary to stress that this aura of exclusivity is not in any way at odds with increasingly high numbers of visitors to these exhibitions, or with the notion that exhibitions were increasingly visited and perhaps even "dominated" by members of the lower, non-bourgeois classes, or that this was even at odds with conscious attempts by the designers of exhibitions to encourage attendance by non-bourgeois visitors. On the contrary: all of these developments might very well even have necessitated the establishment of tacit codes of conduct, i.e. behavioural patterns, through which it became possible to send out a signal to other attendants of an exhibition that one was part of a more exquisite and exclusive circle of visitors. More specifically, by demonstrating that one was able to appreciate the art on display on an intellectual level, one could prove that one was a member of the educated bourgeoisie.[92]

[92] This new emphasis on such tacit and subtle forms of distinction was perhaps also filling a void that had been brought about by the mass production of clothes and other items that determined one's everyday appearance,

This is also where the new genre of art criticism comes in. It was already mentioned in the previous chapter how in the Netherlands this genre had emerged in the 1820s and provided the tools through which to distinguish oneself as a true connoisseur of art. By the 1840s, there were not only far more art critics, mirroring the increase in the number of art exhibitions, but they were also beginning to gain status within the established art world itself – albeit not so much as critics, but as experts in the theory of art and art historians. A good example is provided by the changing membership of the Dutch Royal Institute's Fourth Class, which was devoted to the fine arts. When it was established by Louis Napoleon at the beginning of the 19th century, the majority of its members had been practising artists; by the middle of the 19th century, the entire Institute had been reorganised – more specifically, it had been dissolved, then re-founded and re-christened as the Royal Academy of Sciences (KNAW). Significantly, though, instead of four "classes" the Academy now comprised two sections: one for the Sciences and one for the Arts (in the broadest sense of the word); even more importantly, the artists that had belonged to the Fourth Class of the Institute were now effectively barred from regaining their membership of this national institution. Instead of being welcomed as members of the section for the Arts, they were being replaced by art experts.[93]

In a sense these experts were filling a void left by the artists themselves, as their overall social status and the way they fashioned themselves changed and they increasingly adopted bohemian manners.[94] Gradually, this distinction between the creative but unpredictable artist and the more sober art expert was reflected at art museums too, as by the end of the 19th century art experts and historians rather than painters were usually entrusted with looking after an institution's collection. Providing a clear indication of its 18th century roots, this was not the case at Teylers Museum, where even Scholten's successor John Frederik Hulk, who arrived in 1907, was first and foremost a painter.

But let us return to the specific matter of behaviour at an art exhibition. A detailed analysis and full characterisation of the public that attended 19th century exhibitions and museums is, unfortunately, far too complex for the confines of this particular study. The exact origins of art exhibitions' exclusive aura is therefore hard to pinpoint, just as the verdict is still out as to whether this aura was actually in any way justified;[95] far more importantly though, the fact that this aura arose and that specific behavioural patterns for the exhibition and museum-going public had been established and become recognisable by the middle of the century is incontrovertible. Some of these rules were explicit and actively encouraged, whilst others

---

because this in turn meant that public appearances were less obviously revealing. On this see: Richard Sennett, *The Fall of Public Man* (New York; London: W.W. Norton, 1992), 20.

[93] Klaas van Berkel, *De Stem van de Wetenschap: Geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*, vol. 1 (Amsterdam: Bert Bakker, 2008), 357–361.

[94] Mayken Jonkman, "Couleur Locale: Het schildersatelier en de status van de kunstenaar," in *Mythen van het atelier: werkplaats en schilderpraktijk van de negentiende-eeuwse Nederlandse kunstenaar*, ed. Mayken Jonkman and Eva Geudeker (Zwolle; Den Haag: d'jonge Hond; RKD, 2010), 26; Chris Stolwijk, *Uit de schilderswereld: Nederlandse kunstschilders in de tweede helft van de negentiende eeuw* (Leiden: Primavera Pers, 1998), 274–275. (See previous chapter.)

[95] For first attempts at coming to terms with this phenomenon see: Annemiek Ouwerkerk, *Tussen kunst en publiek: een beeld van de kunstkritiek in Nederland in de eerste helft van de negentiende eeuw* (Leiden: Primavera Pers, 2003); Lieske Tibbe and Martin Weiss, eds., *Druk bekeken: collecties en hun publiek in de 19e eeuw*, vol. 3, De Negentiende Eeuw 34 (Hilversum: Verloren, 2010).

were implicit; many were almost ritualistic. They included dressing properly, buying a catalogue, and sporting one's knowledge of both art and other exhibitions.

Alongside the obvious increase in demand for art critics, the clearest indication that codes of conduct to set oneself off from the uninitiated and therefore "common" visitors had emerged, is that these codes of conduct were mocked. There are numerous caricatures portraying the stark contrast between the slightly snobbish connoisseur of the arts and the common visitor who behaves in an uncivilised manner.[96]

Crucially, this in turn reflects how art exhibitions had become venues to stake a claim to social status. Far more than just places to study the art on display, they became a nodal point of public social life. At exhibitions, visitors could not only demonstrate and improve their own credentials as cultured members of society, they could also find other likeminded citizens.

A telling example is provided by an essay published by the well-known Dutch author Nicolas Beets, who wrote under the pseudonym of Hildebrand. In the late 1830s, around about the time of the construction of the First Art Gallery at Teylers, he published an essay in the national journal *De Gids* (comparable in status to *Punch* in Great Britain) in which he mockingly caricaturised imaginary visitors to the annual state exhibition of fine art in The Hague. He described one mother's disappointment at having unwittingly arrived too early: "This upsets the somewhat fashionable lady; nobody to see! nobody to see her lovely daughter!"[97]

In the same essay Beets mentions the Teyler Museum too: a painter who is exceedingly frustrated that the work he has contributed to the exhibition in The Hague is badly hung and not appropriately admired by both critics and visitors, complains that he had initially dreamed that "Teylers museum will want to acquire it; the Princess of Orange will need to own it; a connoisseur will offer to invest in it with gold!"[98]

And while, strictly speaking, this example only shows that by this time Teylers Museum was clearly considered part of the established Dutch art scene, another example from some twenty years later indicates that it was increasingly being held accountable for its role as a public institution too. In 1860, after the Foundation had acquired a painting of an historical scene by Koster, a newspaper article drew attention to the fact that Koster's painting was not historically accurate, while another one by Gruyter depicting the same scene that had been sold at the same auction, was. The author of the article feels he has to say the following:

"It is not our custom to draw parallels between artists: however, in this case we feel compelled to do so, because the Painting by Koster, bought by Teylers society [the Teyler

[96] See for example: Ouwerkerk, *Tussen kunst en publiek: een beeld van de kunstkritiek in Nederland in de eerste helft van de negentiende eeuw*, 106–107.
[97] "Dit valt de nog wel eenigszins wereldsche dame tegen; niemand om gezien te worden! niemand om hare lieve dochter te zien!" Hildebrand, "Eene tentoonstelling van schilderijen," in *Camera obscura*, vol. 1 (Amsterdam: Athenaeum-Polak & Van Gennep, 1998), 325–326.
[98] "Teylers museum zal het willen aankoopen; de Prinses van Oranje zal het moeten bezitten; een liefhebber zal aanbieden het met goud te beleggen!" Ibid., 322.

Foundation], gives a false representation of a memorable subject to both contemporaries and following generations; *after all, that society displays its collection publicly* [emphasis MW]; the painting by GRUYTER on the other hand will probably find its way into some private collection, and we therefore advise the trustees of Teylers society to investigate the matter, and to invite the erring painter to correct these flaws, if there are grounds for doing this."[99]

This is indicative of how influential public exhibitions were considered to be by this time and how they were increasingly attributed an educational function as well (more on this will be said in the next section of this chapter) – and that Teylers Museum was not considered an exception.

A final indication that Teylers Museum was increasingly taking on a role as a public art museum is provided by its description in travel guides. As the tourist trade increased, travel reports as they had been published in the 18th century were replaced by travel guides, tailored to the specific needs of tourists and written in an impersonal style. The most famous and popular of these was "the Baedeker", a series of guides covering various countries and named after the author and publisher of the series' first edition, Karl Baedeker. Incidentally, the characteristic red binding of the travel guides published under his name is even discernible on some 19th century depictions of art gallery interiors.[100]

An early edition of the guide to Holland, published in 1854, stated that Teylers Museum included "a number of paintings of the modern Dutch school, [and] valuable drawings of old masters" besides the other collections (which were described with the bywords "considerable" and "well equipped"); but by 1880, although the updated edition still contained almost exactly the same information on the scientific collections, the authors had expanded their section on the collections of fine art considerably.[101] Other early guidebooks, such as one published by John Murray in 1858, already placed a far larger emphasis on the art collection than on the scientific ones. This guide mentions the art collections first, and subsequently says next to nothing about the collection of scientific instruments, only drawing attention to "two curious specimens" in the collection of fossils.[102]

This is in stark contrast with travel reports from half a century earlier. Recall how during van Marum's times the scientific instruments had been cited as the reason to visit the museum and how the art collections were not even mentioned in the majority of travel reports.

---

[99] "Het is onze gewoonte niet, om paralellen tusschen kunstenaars te trekken: in dit geval echter rekenen wij er ons toe verpligt, omdat de Schilderij van Koster, door Teylers genootschap aangekocht, tijgenoten zoowel als nakomelingen, van een gedenkwaardig voorwerp eene valsche voorstelling zal geven; *immers dat genootschap laat zijne verzameling publiek bezichtigen* [emphasis MW]; de schilderij van GRUYTER daarentegen krijgt waarschijnlijk eene plaats in een of ander particulier kabinet, en wij zouden dus de directie van Teylers genootschap aanraden, de zaak te onderzoeken, en den fautieven schilder uitnoodigen, die gebreken te herstellen, indien daartoe termen zijn." *Nieuw Amsterdamsch Handels- en Effectenblad*, No. 265, 24.09.1860.

[100] An example is Johann Lorenz Maaß's painting of the Rubenssaal at the *Alte Pinakothek* in Munich, c. 1880.

[101] "eine Anzahl von Gemälden der neuern holländischen Schule, [und] werthvolle Handzeichnungen älterer Meister"; "ansehnlich"; "gut ausgerüstet"; *Holland: Handbuch für Reisende*, 3rd ed. (Koblenz: Karl Bädeker, 1854), 104–105; *Belgien und Holland, nebst den wichtigsten Routen durch Luxemburg: Handbuch für Reisende.*, 15th ed. (Leipzig: Karl Bädeker, 1880), 286.

[102] *A Handbook for Travellers on the Continent: Being a Guide to Holland, Belgium, Prussia, Northern Germany, and the Rhine from Holland to Switzerland*, 12th ed. (London: John Murray, 1858), 45.

IV. Changing Defintion of Museums

1. From Scholarly Musaeum to Educational Museum

Having now illustrated how the sciences were becoming ever more specialised and how Teylers Museum was increasingly being perceived as a public art museum and purveyor of social status, attention needs to be drawn to another area that was changing fundamentally and which is important to keep in mind when trying to understand the overall development of Teylers Museum and the status of its scientific instrument collection around the time of van der Willigen's curatorship in particular: the connotations the term "museum" carried were changing profoundly – throughout the Western hemisphere, and in all languages.

This is obviously a generalisation, and some caution is of course called for; to what extent this word's connotations changed where – and when – was of course largely dependent on local circumstance. A comprehensive analysis of the word's etymological development across all Western countries around the middle of the 19th century would perhaps shed some light on the complexity and the idiosyncrasies of these developments, but such a survey obviously lies far beyond the scope of this study of Teylers Museum's history.

Crucially however, despite the immense complexity of these developments, there is no denying the fact that a fundamental shift was taking place during this period – by the 1860s the associations any usage of the term "museum" evoked would have been very different from those just a few decades earlier or during, say, van Marum's lifetime. Put differently, the expectations that visitors would have had of any institution sporting the label "museum" were changing. It is of pivotal importance to be aware of this when coming to terms with any aspect of the history of Teylers Museum.

More specifically, the general consensus as to what role "museums" were to play within society was increasingly divorced from the late Renaissance notion of a "musaeum": rather than being seen as centres of scholarly study, museums were increasingly equated with the public display of the collections they housed.

What's more – and perhaps even most importantly – the whole point of their displays began to be an educational one: visitors to any museum were supposed to "take home" a certain lesson or message. In the case of arts and crafts museums for instance, visitors were supposed to be inspired by, take as an example and subsequently emulate what was deemed to be the beautiful design – undertaken according to aesthetic principles – of the objects and tools on display. Increasingly, the aim of a museum was therefore also to attract as many visitors as possible.

All of the changes just described are most clearly discernible in Victorian Great Britain. This may seem far-removed from events in Haarlem, but what was happening across the channel is more relevant than one might expect and certainly provided the relief against which developments at museums across the rest of the world need to be seen.

2. The Great Exhibition, "Albertopolis" and the South Kensington Museum

In fact many of the changes just summarised are not only discernible in Great Britain, but their origins are to be found there too – more precisely in the flurry of activity unleashed by Prince Albert. He successfully tried to use his position as Consort to the Queen (although he was only officially granted that title long after Victoria acceded to the throne) to ensure that British culture and technology not only remained competitive, but should also be seen to be in the vanguard of progress.[103] Interestingly, Albert had clear ideas as to how this was to come about, many of which echo the cultural ideals with which he would have been infused during the formative years of his youth and his studies at university in Germany.[104] His serious commitment therefore brought about a confluence of German and British traditions and approaches to cultural matters. But it was the sheer scope of Albert's efforts as Prince and the scale of their success that ensured the effects were felt way beyond the borders of the British Isles – i.e. in places like Haarlem, too.

Albert's pièce de résistance was the "Great Exhibition of the Works of Industry of All Nations", held in London in 1851.[105] The name essentially said it all: it was basically a huge international industrial trade fair. But its impact can hardly be overestimated. It was held for several months in the spectacular glass and iron building nicknamed the "Crystal Palace" in Hyde Park and not only was it unprecedented in its scale, but it also attracted an unexpectedly huge amount of visitors from all over the world. So many, in fact, that the Exhibition turned a profit. Within no time the Exhibition had become an iconic symbol of modernity and progress, an image which was only enhanced by the fact that this spectacular showcasing of mankind's most recent groundbreaking achievements provided a stark contrast with the bloody revolts that had gripped Europe just a few years earlier, during the democratic uprisings of 1848 with their nationalist undercurrent. The Exhibition soon eclipsed all previous fairs of a similar nature, such as the national expositions in Paris.[106]

The Great Exhibition, as it was referred to, inevitably had a huge impact on the way exhibitions were held and displays were designed throughout Europe and North America. Three ways in which its impact manifested itself are particularly relevant.

Firstly, over the course of the following decades a myriad of exhibitions emulating the one in London was held throughout the world. Many more World's Fairs were held in different countries over the course of the next decades – such as, for instance, the Exposition universelle in Paris in 1867, the Weltausstellung in Vienna in 1873 or the Centennial in

[103] See for instance: Julius Bryant, "'Albertopolis': The German Sources of the Victoria and Albert Museum," in *Art and Design for All: The Victoria and Albert Museum*, ed. Julius Bryant (London: V&A Publishing, 2011), 26.
[104] Ibid., 27–29.
[105] On this see for instance: Jeffrey A. Auerbach, *The Great Exhibition of 1851: a Nation on Display* (New Haven: Yale University Press, 1999).
[106] For a very brief summary of these fairs see: Bruno Giberti, *Designing the Centennial: a History of the 1876 International Exhibition in Philadelphia* (Lexington: University Press of Kentucky, 2002), 3.

Philadelphia in 1876.[107] Meanwhile, many smaller ones were organised in all countries for all branches of trade and industry. The Netherlands were no exception and can also serve as an excellent example of just how much of an impact the Great Exhibition had and how it had captured everyone's imagination: one need only take a look at a depiction of the so-called *Paleis van Volksvlijt* (Palace of the People's Diligence), which was set up in 1865, to see that it was clearly modelled on the Crystal Palace.[108] The Amsterdam *Paleis* – basically a huge exhibition area – was founded upon the initiative of Samuel Sarphati, who unsurprisingly appears to have developed and first started pitching the idea for this project shortly after he returned from the Great Exhibition in London. His efforts having born fruit, the building's cornerstone was laid in 1859 in the presence of King William III. Six years later its first exhibition – on agriculture – was opened to the public.

Secondly, it became fashionable to attend these fairs and to be seen at the places where they were held. As was already said, the Great Exhibition was essentially a trade fair, in that it provided manufacturers from all over the world with an opportunity to present their products and allowed for a comparison with similar products from other nations. The subsequent World's Fairs were no different. But after 1851, they started to acquire the same sort of high-brow, exclusive aura that temporary exhibitions of fine art already had during the previous decades, as was described above. In other words World's Fairs – or trade exhibitions – became places to "see and be seen" as well. The reason this is relevant is that some of this inevitably rubbed off on the industrial products on display and, by extension, technology and engineering itself. There was now less of a difference between a painting that was lauded by the art critics at an art exhibition and an industrial product that was singled out for praise by the expert juries that were always assembled to award prizes to individual manufacturers. Note however that this is still a long way off from defining science or engineering itself as an "art" and a cultured activity and that the World's Fairs' primary purpose was still to aid and abet trade and business. Technology could lead to progress, but it was not an art.

Thirdly and perhaps most importantly, Albert used the impetus provided by the Great Exhibition to establish what is considered to be, "in respect of its content, its functioning and the public that it targeted, the first modern museum" – the South Kensington Museum, rechristened in 1899 as the Victoria & Albert Museum.[109] This was possible because the Great Exhibition had turned a profit. Even before the exhibitors left Hyde Park, Albert had acquired land in South Kensington and started debating his vision of erecting a cultural centre for the public in this area of London.[110] Over the course of the next years he had elaborate plans drawn up for a huge set of buildings by the German architect Gottfried Semper, who

[107] On the Centennial see for instance: Giberti, *Designing the Centennial: a History of the 1876 International Exhibition in Philadelphia*. This book also contains brief summaries of the other fairs mentioned: Ibid., 7–15.
[108] For 19th century industrial trade fairs held in the Netherlands before and after the Great Exhibition see: Titus M. Eliëns, *Kunst, nijverheid, kunstnijverheid: de nationale nijverheidstentoonstellingen als spiegel van de Nederlandse kunstnijverheid in de negentiende eeuw* (Zutphen: Walburg Pers, 1990). On the Paleis see: Emile Wennekes, *Het Paleis voor Volksvlijt (1864-1929): "Edele uiting eener stoute gedachte!"* (Den Haag: Sdu, 1999).
[109] Krzysztof Pomian, "The South Kensington Museum: A Turning Point," in *Art and Design for All: The Victoria and Albert Museum* (London: V&A Publishing, 2011), 41.
[110] Bryant, "'Albertopolis': The German Sources of the Victoria and Albert Museum," 25–27.

had seen himself forced to flee the German town of Dresden following his support for the Democratic uprisings there in 1849. Albert's scheme proved to be too ambitious – it was mockingly referred to as "Albertopolis" by his detractors – but did yield the South Kensington Museum. This museum of the applied arts was a major achievement in and of itself. It first opened to the public in 1857 and was housed in the so-called "Brompton Boilers". Although the building itself heralded what was to come – it was the first permanent exhibition hall to sport gas lighting, enabling longer opening hours and was also the first museum to include a restaurant[111] – it proved to be only temporary, with construction immediately commencing on the more imperial building that houses the Victoria & Albert Museum to this day and which was completed in 1909.[112]

The museum's initiators – Albert entrusted Henry Cole (later Sir Henry Cole) with overseeing the implementation of his plans – were hoping for it to operate on a number of levels. Early on Albert for instance emphasised that any cultural centre in South Kensington should underscore cooperation and peace amongst the nations of the world.[113] On a more palpable level, the aim of the South Kensington Museum as it was opened in 1857 was to provide craftsmen with examples of good design – both technical and aesthetic – in order to provide them with inspiration for their own work. In the long term this was to yield some economic benefit by ensuring British industrial products remained competitive.[114]

3. The Public Museum in Support of Public Mores

Perhaps most importantly, though, the museum was also supposed to instil visitors with moral values. Cole for one explicitly stated as much, taking the view that a visit to a museum was far preferable to a visit to the pub. In 1875 for instance he adopted an almost missionary tone, saying:

"[O]pen all museums of Science and Art after the hours of divine service; let the working man get his refreshment there in company with his wife and children, rather than leave him to booze away from them in the Public House and Gin Palace. The Museum will certainly lead him to wisdom and gentleness, and to Heaven, whilst the latter will lead him to brutality and perdition."[115]

---

[111] Pomian, "The South Kensington Museum: A Turning Point," 42.
[112] Bryant, "'Albertopolis': The German Sources of the Victoria and Albert Museum," 34–35.
[113] Ibid., 26–27.
[114] Edward P. Alexander, *Museum Masters: Their Museums and Their Influence* (Nashville: American Association for State and Local History, 1983), 158.
[115] As quoted in: Tony Bennett, *The Birth of the Museum: History, Theory, Politics* (London; New York: Routledge, 1995), 21. Parts of this specific speech of Cole's are also quoted and contextualised in: Andrew McClellan, "A Brief History of the Art Museum Public," in *Art and Its Publics: Museum Studies at the Millennium*, ed. Andrew McClellan (Malden: Blackwell, 2003), 10.

What's more, Cole was not just a lone eccentric in this respect. Similar views were vociferously put forward by contemporaries of his such as the writer and critic Matthew Arnold or the art critic John Ruskin.[116]

It is also worth pausing to realise that a museum's message for its visitors did not necessary have to be all too explicit. While Cole for one was obviously perfectly open about this, it is unlikely that most of the visitors he was aiming for would have been aware of these moral overtones to the South Kensington Museum. Bearing this in mind, it is all the more striking how behavioural patterns that first arose at temporary art exhibitions (in the way described above) were soon adopted at museums in general and eventually even encouraged. It is significant that Ruskin and Arnold were literary or art critics, i.e. defined themselves through the genre that had arisen simultaneously – and not coincidentally – with the codes of conduct that were to be adhered to during a visit to an exhibition, as illustrated in the previous section.

In addition to this it also does not seem coincidental that the 19th century – particularly the later 19th century – saw the emergence of a specific set of architectural styles which gradually made museums instantly recognisable. The design of newly constructed museums was usually reminiscent of what were considered pinnacle achievements of past cultures – constructions echoing the temples of antiquity or fashioned in a neo-Gothic style spring to mind.[117] More importantly, though, these buildings suggested and encouraged a certain type of behaviour – running, talking loudly, or touching the items on display for instance was all not desirable.

One can easily take this one step further and define the museums that sprang up all over Europe during the second half of the 19th century as nothing other than lessons in "civility" – i.e. good behaviour in the public domain – paid for and encouraged by those who shaped and ran these institutions.

It is important to keep in mind however that this, too, is a generalisation. What's more, most studies on the history of collections that couch developments in these terms have inevitably focused on the designers of exhibitions, rather than the visitors.[118] Even if there is no denying the fact that Cole and others touted the idea of museums as tools of cultural engineering, the verdict is still out as to how effective their efforts were. Furthermore, all evidence seems to suggest that this notion of a museum as an educational tool only caught on in the Netherlands a lot later than it did in other countries.[119] However, that does not mean that these undeniable developments weren't at least noticed in the Netherlands too and helped bring about the

[116] See for example: McClellan, "A Brief History of the Art Museum Public," 7–16.
[117] For an analysis of the architectural principles underlying the design of newly constructed museums as well as contemporary discussions surrounding the choice of particular designs, see for instance: Carla Yanni, *Nature's Museums: Victorian Science and the Architecture of Display* (New York: Princeton Architectural Press, 2005); Sophie Forgan, "Building the Museum: Knowledge, Conflict, and the Power of Place," *Isis* 96, no. 4 (2005): 572–585; Bennett, *The Birth of the Museum: History, Theory, Politics*, 48–58.
[118] This has a lot to do with the fact that the primary sources that would allow one to conduct any meaningful survey of the effect exhibitions had on visitors are only now starting to become available for systematic analysis through digitization. Tony Bennett was already listed as an example of an author who saw himself forced to focus on the makers of exhibitions in the introductory section to this study.
[119] Tibbe and Weiss, *Druk bekeken: collecties en hun publiek in de 19e eeuw*, 3:191–192.

gradual shift in connotations the word "museum" carried. The Dutch situation will be addressed in a little more detail in section IV of this chapter.

4. Prince Albert and the History of Art

As for Great Britain, Prince Albert's efforts were one of the main factors ensuring that "the focus of museum innovation, which had been centred in France since the 1790s, was now shifting to Great Britain, Germany and Scandinavia, with America close behind".[120] Indeed, he was involved in far more projects than the Great Exhibition and the South Kensington Museum. He took a great interest in the future of the National Gallery, for instance, proposing that it be moved to South Kensington when the question of whether new premises were to be built was being debated. Here, too, his German background is discernible: it has been pointed out that the whole idea of a "cultural centre" reflects Wilhelm von Humboldt's "more integrated, comprehensive approach to universal education" in that the conglomeration of scholarly institutions prevented academics working as recluses.[121] What's more, one can say that "[t]he German concept of a 'cultural centre' for the public, in contrast to Paris's preference for distributing its great public institutions, was due to the smaller regional territories of sovereign rule in Germany before the foundation of the Kaiserreich in 1871".[122]

In the case of the National Gallery, Albert's involvement was ultimately unsuccessful – it remained at Trafalgar Square. But he was able to exert far greater influence on two other projects that are of great importance both to art history and the history of exhibitions.

The first of these is the exhibition *Art Treasures of the United Kingdom* which was held in Manchester in 1857.[123] It could be seen as the fine art-equivalent to the Great Exhibition. It was held in a similar type of industrial-style exhibition hall, expressly constructed for the purpose of the exhibition. The initiative for this project had originally been taken by a group of Manchester manufacturers and businessmen, who were hoping to enhance their city's image by associating it with some of the masterpieces fine art had produced over the past centuries. (This is also yet another indication of how art exhibitions had acquired an aura of cultured exclusivity.) They sought Prince Albert's support, well aware that this would help persuade other members of the nobility with an art collection to loan the organisers of the Manchester exhibition some of their works of art. Prince Albert, interestingly enough, then insisted that the exhibition should serve more than "the gratification of public curiosity, and the giving of intellectual entertainment to the dense population of a particular locality [Manchester]". Rather, he suggested (read: insisted) that "national usefulness might […] be found in the educational direction which may be given to the whole scheme". He was even

[120] Pomian, "The South Kensington Museum: A Turning Point," 41.
[121] Bryant, "'Albertopolis': The German Sources of the Victoria and Albert Museum," 28.
[122] Ibid.
[123] On this exhibition see: Francis Haskell, *The Ephemeral Museum: Old Master Paintings and the Rise of the Art Exhibition* (New Haven; London: Yale University Press, 2000), 82–89.

more specific, pointing out: "If the collection you propose to form were made to illustrate the history of Art in a chronological and systematic arrangement, it would speak powerfully to the public mind".[124]

This goes to show how Albert was well aware of the latest developments in art history. A chronological hanging had first been introduced at the Belvedere in Vienna at the end of the 18th century, but was by no means usual by the second half of the 19th century.[125] Although it was more recently being espoused by Albert's former compatriot, Gustav Waagen, the director of the Berlin picture gallery. It was Waagen – perhaps not coincidentally – who had also exerted some influence over the presentation of British collections through the publication of his thoughts on the National Gallery during the period of its reorganisation in the early 1850s and who had compiled a three-volume book "Treasures of Art in Great Britain" which had in turn incited the Manchester businessmen to organise "their" exhibition.[126]

Albert's suggestions were followed up and – whether this had anything to do with it or not – the exhibition was a major success, with many (later) celebrities such as Karl Marx, Charles Dickens, Florence Nightingale and even the Queen of The Netherlands attending. [127] More exhibitions devoted to Old Masters were organised in its wake – before the Manchester show, the word "exhibition" had apparently been associated primarily with the display of paintings by contemporary artists.[128] Finally, what is once again striking is the confluence of British and German traditions. It has even been said that the Manchester exhibition "was a German exhibition", in that "it set out to challenge many of the principles that had governed the fashionable exhibitions organised over the previous forty years by the British Institution and its galleries in Pall Mall".[129]

The second example of Prince Albert's importance for the discipline of art history is his idea to compile a collection of copies of all works of Raphael. He came up with the idea in late 1852, having decided that the collections at the Royal Library at Windsor Castle – which included far more works by Old Masters apart from some by Raphael, such as a large number of works by Michelangelo – required thorough reordering so as "to afford increased facility of reference to these various valuable art treasures, and thus to render them available for a thorough and critical illustration of the history of painting".[130] The idea was to start by focusing on one Old Master, and "the Prince chose that master for who he has always

[124] As quoted in: Ibid., 84.
[125] On developments in Vienna in the late 18th century see: Debora J. Meijers, *Kunst als Natur: Die Habsburger Gemäldegalerie in Wien um 1780* (Wien: Kunsthistorisches Museum Wien, 1995). On later trends concerning the design of art exhibitions see: Charlotte Klonk, *Spaces of Experience: Art Gallery Interiors from 1800 to 2000* (New Haven; London: Yale University Press, 2009).
[126] Christopher Whitehead, *The Public Art Museum in Nineteenth Century Britain: The Development of the National Gallery* (Aldershot: Ashgate, 2005), 17–20; Haskell, *The Ephemeral Museum: Old Master Paintings and the Rise of the Art Exhibition*, 83.
[127] Haskell, *The Ephemeral Museum: Old Master Paintings and the Rise of the Art Exhibition*, 88.
[128] Ibid.
[129] Ibid., 83.
[130] Carl Ruland, *The Works of Raphael Santi Da Urbino as Represented in The Raphael Collection in the Royal Library at Windsor Castle, Formed by H.R.H. The Prince Consort, 1853-1861 and Completed by Her Majesty Queen Victoria*, 1876, viii.

entertained the strongest predilection", as was later explained.[131] In February 1853 Albert's librarian, Carl Ruland, began to acquire whatever engravings, lithographs or photographs of works by Raphael were available. This task was greatly facilitated by the fact that a complete catalogue of Raphael's oeuvre had recently been compiled by Johann David Passavant.

Soon, however, Ruland saw himself confronted with the problem that, in the case of many of Raphael's works, copies had never been made. As he later remembered, "[i]n these instances the newly-invented art of photography was resorted to".[132] Indeed, what was considered to be the first photographic image depicting some level of detail had only been taken in 1838 by Louis Daguerre. Using Albert's influence, photographers were subsequently dispatched across the Continent to take photographs of Raphael's works. The task proved Herculean, and a catalogue was only published two years after Albert's untimely demise, in 1863.

5. London Calling Haarlem

Aside from the fact that this was "one of the first attempts to build up a complete collection of illustrations of the works of a single artist"[133], it is this compilation of copies of all of Raphael's works that can serve to illustrate how the ripples caused by the flurry of activity unleashed by Albert in London eventually reached Teylers Museum in Haarlem.

As was already mentioned in the previous chapter, Teylers Museum's art collection contained drawings by Raphael, acquired as part of Christina of Sweden's collection in 1790. They had not been forgotten by Passavant and therefore did not go unnoticed by Ruland either. In July 1859 the Dutch King's Commissioner for the province of North Holland approached the trustees of the Teyler Foundation, passing on a request from Albert "to obtain, for the benefit of H.R.H., photographs of drawings by Raphael that are in the art collection of T.F. [the Teyler Foundation]", as the minutes of the trustees' meetings read.[134] The trustees promptly replied that they were "most pleased" to do this, although they did ask that the photographs be taken "under the supervision of the custodian of Teylers Art Collection in the building of T.F."[135]

Interestingly enough, the Commissioner soon added a request of his own: in September he enquired whether it would be possible that the "photographic depictions […] were made

[131] E. Becker and C. Ruland, "The 'Raphael Collection' of H.R.H. The Prince Consort," *The Fine Arts Quarterly Review* 1 (1863): 28.
[132] Ibid., 29.
[133] Jennifer Montagu, "The 'Ruland/Raphael Collection'," in *Art History through the Camera's Lens*, ed. Helene E. Roberts (Australia: Gordon and Breach, 1995), 37.
[134] "om ten behoeve van Z.K.H. photographien te erlangen van teekeningen van Raphaël, die zich in de kunstverzameling van T.St. bevinden"; "Directienotulen", 08.07.1859, Haarlem, ATS, vol. 9.
[135] "gaarne bereid"; "onder toezigt van den bewaarder van Teijlers Kunstverzameling in het gebouw van T.St."; Ibid.

public by the photographer".[136] No explanation as to what exactly was meant by "making them public" was added to the minutes of the meeting at which the trustees discussed this – they only reveal that the trustees agreed to the Commissioner's proposal. Maybe he was thinking of an exhibition, or a publication. The fact that the trustees did agree was not self-evident. Many other owners of works by Raphael who had been approached by Ruland or Albert were far more restrictive, sometimes demanding that they could keep the negatives of the photographs taken, or explicitly demanding that impressions of the negatives should not be sold.[137] This is an interesting example of how the advent of photography brought about a recalibration of the status of "original" works of art with regard to their reproducibility. In an article describing the efforts he had undertaken, which was published after the completion of the catalogue, Ruland included a list of the many institutions that had allowed photographs to be taken of the works in their possession and marked those from which copies could be obtained with an asterisk. Strangely enough the Teyler Foundation is listed as having allowed photographs of "about 25" drawings to be taken, but there is no asterisk beside their entry.[138] Perhaps the Commissioner had dropped the entire idea by the time the photographs were actually taken, because this appears to have taken some time. In fact it is only in August 1861 that one finds the following passage in the minutes of a meeting of the trustees:

"From Mr C. Ruland, private secretary of H.R.H. the Prince Consort of England, two Series of photographs of drawings by Raphael present in Teylers Museum have been received, with an attendant letter missive, in which on behalf of the Prince gratitude is expressed to the Trustees for the permission to have photographs made of those drawings, & also [unreadable] the particular satisfaction of the Prince about the way these photographs have been produced by Mr Tinker [name unreadable], a local photographer."[139]

The trustees duly sent a reply thanking Ruland two weeks later. And whether impressions of the photographs were "made public" or not, the entire episode does demonstrate how, on the one hand, Teylers Museum, too, was directly affected by what was happening in London and, on the other hand, how Teylers Museum's collection of fine art was considered to be of international importance. And it is yet another indication that in the Netherlands as well, attitudes towards the public had changed in so far that it was not considered out of the ordinary for a King's Commissioner to try and let the public share in the fruits of technological advance that had made possible the reproduction of some masterpieces of fine art, by enquiring whether the photographer could make these images public – whatever that meant, exactly. So, having obtained an impression of what was going on in Great Britain, it is

[136] "photografische afbeeldsels […] door den photografist publiek worden gemaakt"; "Directienotulen, 23.09.1859, Haarlem, ATS, vol. 9.
[137] Montagu, "The 'Ruland/Raphael Collection'," 38–40.
[138] Becker and Ruland, "The 'Raphael Collection' of H.R.H. The Prince Consort," 32.
[139] "Van den Heer C. Ruland, particulieren Secretaris van Z.K.H. den Prinsgemaal van Engeland, zijn ontvangen twee Serien van photographien van in Teylers Museum aanwezige teekeningen van Raphaël, met eene geleidende missive, waarin namens den Prins aan Directeuren dank betuigd wordt voor de verleende vergunning om photographien van die teekeningen te laten maken, & tevens [unreadable] de bijzondere tevredenheid van den Prins over de wijze waarop die photographien door den Heer Tinker [unreadable] photograaf alhier, vervaardigd zijn." "Directienotulen", 02.08.1861, Haarlem, ATS, vol. 9.

time to take a closer look at what role museums were ascribed in the Netherlands halfway through the 19th century.

IV. Jacob Gijsbertus Samuël van Breda at Teylers Museum

1. Mid-Century Dutch Liberalism

From what was described in the previous section it clearly transpires that the connotations the term "museum" carried were changing profoundly around the middle of the 19th century and that the effects of this were reflected by events in the Netherlands on a number of levels. It is important to have at least an inkling of what huge shifts were taking place even before the last quarter of the 19th century in order to be able to contextualise what was happening at Teylers Museum in Haarlem. However, as was already suggested above, one also needs to realise that a profound impact resulting from what was happening in countries such as Great Britain and Germany with regard to the public display of collections was only really felt towards the end of the 19th century in the Netherlands. Despite such obvious connections with international developments like the *Paleis van Volksvlijt* in Amsterdam or the photographs taken of Raphael's drawings at Teylers upon Prince Albert's request, the direct effect of all these developments was initially more tangential in nature – certainly in Haarlem. The kind of cultural ideal espoused by Prince Albert and others did not catch on in the Netherlands until the final quarter of the 19th century.

There are two main reasons that there is no sign of the changes taking place elsewhere immediately being embraced in Haarlem or, for that matter, in the rest of the Netherlands. The first of these is the strictly liberal approach of successive Dutch governments in all matters pertaining to cultural policy. Their attitude inevitably played a significant part in setting the boundaries within which the role of museums in Dutch society – including Teylers Museum – was determined. The second reason is more directly relevant to the situation at Teylers Museum: van Marum's successor and van der Willigen's predecessor, Jacob Gijsbertus Samuël van Breda, proved not to be open to the kind of innovation taking place in Great Britain and other surrounding countries. He had something of a patrician attitude concerning his role at the museum and adopted more of an "old school" approach as to what public role the collections under his purview were to fulfil. Although van Breda expanded the collections and used his considerable reputation and clout to ensure they remained of a high quality, the overall role they fulfilled was still much the same when van Breda left as it had been when van Marum passed away.

Both points deserve more scrutiny. Let us start with the first. Without exaggerating much, the Dutch government's policy with regard to museums up until the 1870s can be easily summarised: it essentially rejected all calls for it to get involved in any significant way, no

matter who was in charge of government as first minister. A good example is provided by the state's art collections, distributed across three venues: paintings and other works of art were on display in Amsterdam at the Trippenhuis, in Haarlem at Paviljoen Welgelegen, and in The Hague at the Royal Cabinet of Paintings (*Koninklijk Kabinet van Schilderijen*). The core of the collections in Amsterdam and The Hague was formed by former Royal collections, and many of the paintings on display in The Hague had in fact already been accessible to the general public at the so-called Prince William Gallery (*Galerij van Prins Willem V* op de Buitenhof) even before the French Revolution.[140] However, after 1832, up until the 1870s, practically not a penny was spent on any new acquisitions to expand or update these collections, let alone any kind of new premises in which they could be displayed.[141] There was, therefore, no leeway for any sort of transformation of these museums into educational institutions even if that had been deemed desirable. They essentially retained the same guise which they had been given shortly after their establishment in the aftermath of the Restoration period.

Again, there were two main reasons for this pertinent lack of funding for state museums: the first was that there really simply was no money to go around. The Belgian secession of 1830 and King William I's subsequent denial of that fact that his kingdom had been diminished left the state coffers bare – all the more so because the King had taken the fateful decision of focusing on what now became Belgium in his efforts to stimulate the transformation of his kingdom's economy from a predominantly agrarian to an industrialised one; put differently, around the middle of the 19th century the Netherlands were a backwater of industrialisation.[142] The second reason was the long tradition of decentralised governance in the Netherlands, as described in the first chapter of this study. This in turn meant that any form of policy that was perceived to originate from The Hague was eyed a lot more critically and was therefore also far more difficult to implement than any similar form of policy might have been in, say, France if it was authored in Paris. A good case in point are the Dutch King William I's attempts at emphasising a sense of national pride by, for example, founding all sorts of institutions such as national museums. This reflected his desire to build a strong Dutch monarchy on par with other monarchies in Europe. Yet the end result shows the whole futility of his activities: he ended up leaving his son, King William II, with a diminished and financially decrepit kingdom and William II was only narrowly able to avert the state's complete insolvency through a number of radical measures implemented in 1843 and 1844.[143] And as for the national museums, it has already been recounted how at least two of these, the National Museum of National History and the *Rijksmuseum* in Amsterdam, clearly belied their origins as a private collection and a municipal collection respectively. They were nowhere near as glamorous as their counterparts in other nations. What's more, the idea that

[140] For an overview of the history of these collections, their display and the way they were related to each other see: Theodor H. Lunsingh Scheurleer et al., *150 jaar Koninklijk kabinet van schilderijen, Koninklijke Bibliotheek, Koninklijk Penningkabiet* (The Hague: Staatsuitgeverij, 1967); Duparc, *Een eeuw strijd voor Nederlands cultureel erfgoed*, 49–70.
[141] Duparc, *Een eeuw strijd voor Nederlands cultureel erfgoed*, 53 & 56.
[142] For a summary of events during this period of Dutch history see for instance: Michael North, *Geschichte der Niederlande* (München: Beck, 1997), 80–93.
[143] R.A.M. Aerts et al., *Land van kleine gebaren: een politieke geschiedenis van Nederland 1780-1990* (Nijmegen: SUN, 2010), 93.

any central government's role needed to be minimised was seemingly perpetuated in the new Dutch constitution as it was drawn up in 1848, with its strong liberal overtones. In fact, without wanting to caricaturise this complex character, radical liberalism was pretty much epitomised by the principal architect of the new constitution, Rudolf Thorbecke. His own political views, in turn, were discernible in his attitude towards museums. As a young professor in Leiden, for instance, he once left no doubt about the fact that he was not an avid fan of his University's Archaeological Cabinet – the later National Museum of Antiquities. He disparagingly referred to the collection as "dolls and sarcophagi", and stated that he would see them moved to another town "without shedding a tear".[144]

2. Some Critics of Official Dutch Museum Policy

Yet the fact that cultural ideals such as those espoused by Prince Albert did not prevail in the Netherlands and the fact that the state only got involved in cultural matters in any meaningful way after the 1870s does not mean that the role of museums was not critically debated, or the government's liberal stance in cultural matters was never criticised. On the contrary, over the years there were a number of high-profile attempts at stimulating Dutch culture through public, state-funded museums – except that, ultimately, they were all futile.

Take Caspar Reuvens for instance, the first director of the Cabinet of Antiquities in Leiden. He had spent part of his youth in Paris.[145] (Incidentally, upon returning to the Netherlands in 1814 he spent some time with his uncle Jean Henri van Swinden, along with van Marum one of the most prominent Dutch physicists of his generation.[146]) The talented and prolific Reuvens was later appointed the first professor of archaeology at the University of Leiden and simultaneously entrusted with the care of the newly created Cabinet.[147] It soon transpired that he had far-reaching plans for this institution. His aim was to create a collection that would rival those in other major European cities. As much can be inferred from his correspondence with officials in The Hague, in which at one point he insisted that "his" Cabinet's purpose be clearly defined.[148] This in itself is of course a clear indication that the purpose and public role

[144] "poppen en sarkophagen"; "zonder een traan te storten"; as quoted in: Chris Sol, "Mummies op de Schopstoel," *Leids Jaarboekje* 90 (1998): 101. The quote is taken from a report written in 1834. Interestingly, Sol also points out that Thorbecke later vociferously – and perhaps ambivalently – demanded that someone with proper scientific credentials should be placed in charge of the Archaeological Cabinet. I am grateful to Pieter ter Keurs for drawing my attention to the article by Sol.

[145] On Reuvens' early biography see for instance: Ruurd B. Halbertsma, *Scholars, Travellers, and Trade: The Pioneer Years of the National Museum of Antiquities in Leiden, 1818-1840* (London; New York: Routledge, 2003), 21–30; Mirjam Hoijtink, "Caspar J.C. Reuvens en de Musea van Oudheden in Europa (1800-1840)" (PhD-thesis, Universiteit van Amsterdam, 2009), 1–40.

[146] Hoijtink, "Caspar J.C. Reuvens en de Musea van Oudheden in Europa (1800-1840)," 8.

[147] On this see for example: Mirjam Hoijtink, "Een Rijksmuseum in wording: Het Archaeologisch Cabinet in Leiden onder het directoraat van Caspar Reuvens (1818-1835)," in *Het Museale Vaderland*, ed. Ellinoor Bergvelt and Lieske Tibbe, vol. 4, De Negentiende Eeuw 27 (Rotterdam: Werkgroep 19de eeuw, 2003), 227.

[148] Halbertsma, *Scholars, Travellers, and Trade: The Pioneer Years of the National Museum of Antiquities in Leiden, 1818-1840*, 34–43.

of collections was being debated at a high, ministerial level. In fact Reuvens developed detailed plans for a "Museum of Antiquities" at the end of the 1820s, with plans for a whole new building in neo-classical style already being drawn up – even the Royal architect Tieleman Franciscus Suys was involved upon the minister of education's request.[149] According to Reuvens' plans, this Museum was not just to serve scholars of antiquities, but open every day of the week for better accessibility.[150] But alas for Reuvens, despite the fact that he enjoyed the King's support – the monarch had acknowledged the need for a new museum building, to be built either in Leiden or in Brussels in May 1830 – his plans never materialised.[151] They were essentially thwarted once the Belgians declared their independence in October 1830. The economy was already in the doldrums and the King and his government were preoccupied with other matters. Reuvens died just five years later, suddenly and unexpectedly at the young age of 42.

Another example of the role of museums being critically debated is provided by a public lecture delivered in 1840 by the writer Johannes Bosscha sr. – incidentally and yet intriguingly he was the father of van der Willigen's acolyte Johannes Bosscha jr. – which he gave as president of the Holland Society for Liberal Arts and Sciences (*Hollandsche Maatschappij van fraaie kunsten en wetenschappen*, not to be confused with the *Hollandsche Maatschappij der Wetenschappen* or Holland Society in Haarlem that has been mentioned frequently before). According to the author of Bosscha's obituary, the Society's board of trustees subsequently saw to it that "this important piece directly [be] made available separately, in the hope that this would 'promote the flourishing of the arts and sciences in the Netherlands'".[152] It was published under the revealing title "Address, containing an attempt at answering the question: what obligations do governments have with regard to the arts and sciences?" Crucially, it contained the following passage – as summarised in Bosscha's obituary – which is worth quoting at some length to understand the context within which the crucial last sentence was uttered:

"There is in Man an irresistible need to increase his vital sensations. When he doesn't feel alive, he looks for stimuli to rouse himself and to feel that he is alive. Therefore people should be given nobler stimuli than those which, driven by a need inherent in man's nature, they seek in liquor. To cultivate a sense of elegance, beauty and euphony among people, to make them susceptible to enjoyment of art and to provide them with the means to taste this pleasure – this will, although slowly, but in the long run more effectively, be more successful against alcohol abuse than prohibition or excise duty. Our era finds little pleasure in what does not speedily

[149] On these plans see: Hoijtink, "Een Rijksmuseum in wording: Het Archaeologisch Cabinet in Leiden onder het directoraat van Caspar Reuvens (1818-1835)"; Hoijtink, "Caspar J.C. Reuvens en de Musea van Oudheden in Europa (1800-1840)," 145–147. On a drawing of the museum as Reuvens imagined it in 1826 he wrote "Voorlopige Schets van een Museum van Oudheden". On this see: Hoijtink, "Een Rijksmuseum in wording: Het Archaeologisch Cabinet in Leiden onder het directoraat van Caspar Reuvens (1818-1835)," 232.
[150] Hoijtink, "Caspar J.C. Reuvens en de Musea van Oudheden in Europa (1800-1840)," 143.
[151] On the King's support see: Ibid., 145.
[152] "dit belangrijk stuk onverwijld afzonderlijk verkrijgbaar gesteld [werd], in de hoop dat daardoor 'de bloei van kunsten en wetenschappen in Nederland zou bevorderd worden'"; "Redevoering, bevattende een proeve van beantwoording der vraag: welke verpligting rust er op de regeringen ten aanzien van kunsten en wetenschappen?"; Arnold Ising, "Johannes Bosscha," vol. 5, Mannen van Beteekenis (Haarlem: Kruseman & Tjeenk Willink, 1875), 362.

achieve results; but governments, whose task is not confined to one human lifetime, should place a proper appreciation of the long-lasting interests of the people without being carried away by quick results. Our Museums should therefore not just be considered as luxury items, and our public colleges for prospective artists should not be treated as if they were only a means to provide part of the nation with a decent income."[153]

This proposal to establish museums as a good alternative to the escapism offered by liquor is all the more remarkable in that it was put forward many years before Henry Cole expressed the same sentiments.

A third example is provided by an article published in 1844 by Johannes Potgieter, the founder of the hugely popular and influential journal *De Gids*, on the hanging of paintings at the Rijksmuseum in Amsterdam, i.e. at the Trippenhuis. Invoking memories of a time when "the Dutch flag was greeted as the mistress of the sea" and the Netherlands had been a major political power, Potgieter lamented how the museum did not serve to underscore any sense of national pride.[154] In his opinion, focusing on depictions of historical events and hanging them in a chronological order in a manner that did their glorious depictions justice, would go a long way towards cultivating an appropriate sense of nationhood amongst Dutch citizens. Needless to say, his suggestions fell on deaf ears at the Rijksmuseum itself.[155]

A final example of a discussion about the public role of museums involved the Rijksmuseum's collections as well: in 1862 a group of artists and other connoisseurs of the arts took on the task of lending a little more urgency to the idea of constructing a new building for the nation's paintings, as the Trippenhuis was increasingly perceived to be inadequate.[156] The new museum should act as a memorial as well, celebrating 50 years of Dutch monarchy in 1863. It was therefore to carry the name "Museum Koning Willem I", in honour of the first Dutch King. A competition was held in 1863 and 21 architects submitted proposals. The Germans Ludwig and Emil Lange from Munich, who had already designed the museum of fine arts in Leipzig, won first prize. Pierre Cuypers came second. Again, however, these plans never materialised; yet, in this case, many of the members that formed the commission for the proposed new museum were later intimately involved in drawing up plans

[153] "[E]r is in den Mensch een onweerstaanbare behoefte naar verhooging zijner levensgewaarwordingen. Wanneer hij zich niet leven voelt, zoekt hij naar prikkels om zich op te wekken en zich te voelen leven. Men geve dus aan het volk edeler prikkels dan die welke het, gedreven door een behoefte in het wezen van den mensch gelegen, in sterken drank zoekt. Gevoel voor welstand, schoonheid en welluidendheid bij het volk aan te kweeken, het vatbaar te maken voor kunstgenot en het de middelen te verschaffen om dit genot te smaken – dat zal, wel langzaam, maar op den duur beter dan verbods- en belastingwetten tegen het misbruik van sterken drank werken. Onze tijd schept wel geen behagen in hetgeen niet met spoed tot eene uitkomst leidt; doch de regeeringen, wier werkkring zich niet tot één menschenleeftijd bepaalt, behooren een juiste waardeering van de duurzame belangen des volks te stellen boven het wegsleepende van snelle resultaten. Men beschouwe dan onze Musea niet alleen als voorwerpen van louter welde, en behandele onze openbare kweekscholen voor toekomstige kunstenaars niet alsof zij enkel middelen waren om aan een gedeelte der natie een eerlijk bestaan te verschaffen." Ibid., 364.

[154] "de hollandsche vlag werd begroet als de meesteresse der zee"; Everhardus Johannes Potgieter, "Het Rijks-Museum te Amsterdam," in *De werken van E.J. Potgieter*, ed. Johan C. Zimmerman, vol. 2 (Haarlem: H.D. Tjeenk Willink & Zoon, 1903), 100.

[155] Ellinoor Bergvelt, *Pantheon der Gouden Eeuw: van Nationale Konst-Gallerij tot Rijksmuseum van Schilderijen (1798-1896)* (Zwolle: Waanders, 1998), 154–158.

[156] On this project see: Duparc, *Een eeuw strijd voor Nederlands cultureel erfgoed*, 53–55.

for the new Rijksmuseum building as it was completed in 1885 – according to a design by Cuypers. In this sense at least, the commission's work had not been futile.

3. Jacob Gijsbertus Samuël van Breda

Having illustrated how, on the one hand, there were debates on the public role of museums in the Netherlands and how, on the other hand, the Dutch government resisted all calls to get involved more deeply in cultural matters up until the 1870s, it is time to turn to the second, more immediately relevant reason that Teylers Museum – or more precisely the public role of its scientific collections – underwent very little change until after the arrival of van der Willigen in Haarlem. As was already noted above, this had everything to do with van der Willigen's predecessor, van Breda.

More to the point, van Breda's whole demeanour stood for a very traditional way of defining the overall value of the production and consumption of knowledge and therefore also his own role as a "scientist". This was reflected in the way he handled the collections he was entrusted with at Teylers.

In this sense – as arguably in many others – van Breda was a worthy successor to van Marum. The two could be described as kindred spirits. Indeed, they had been friends during van Marum's lifetime. A rare case of van Breda expressing his feelings in an almost melancholy manner shortly after the death of his first wife in 1834 can be found in a letter of his to van Marum.[157] Incidentally, she had been a granddaughter of van Marum's mentor Petrus Camper.[158]

But van Breda and van Marum had a lot to talk about anyway. Both were trained as doctors – van Breda attended university in Leiden – but displayed an even keener interest in the natural sciences. Van Breda was in contact with many of the same researchers van Marum had known before him. Shortly before completing his studies in 1811 for instance, van Breda went on a journey through Germany, visiting many prominent scientific collections and researchers, such as Blumenbach.[159] In 1812 he and two of his friends spent many months in Paris (they may have remained there until 1813), watching and learning from great names such as Thouin or Cuvier. The latter they sought out shortly after arriving in the French capital and van Breda's diary reveals how they found the eminent researcher "in a filthy short coat engaged in the dissection of a Lizard or a Crocodile".[160] Recall that Cuvier had visited van Marum at

[157] A. S. H. Breure, "Biografie," in *Leven en werken van J.G.S. van Breda (1788-1867)*, ed. A.S.H. Breure and J.G. de Bruijn (Haarlem: H.D. Tjeenk Willink, 1979), 15.
[158] Ibid., 13.
[159] On a summary of these journeys see: A. S. H. Breure and J. G. de Bruijn, *Leven en werken van J.G.S. van Breda (1788-1867)* (Haarlem: H.D. Tjeenk Willink, 1979), 59–75.
[160] "in een smerig jasje met de ontleding van een Hagedis of Crocodil bezig"; as quoted in: Ibid., 67.

Teylers just two years earlier and they had discussed the classification of the mosasaur in the collection.

In 1816 Sebald Justinus Brugmans ensured that van Breda was appointed professor of botany, chemistry and pharmaceutics at the Athenaeum in Franeker, about 80km west of Groningen. It was here that he got to know his first wife. They married in 1821, shortly before van Breda took up a more prestigious professorship in botany, zoology and comparative anatomy at the University of Ghent. In 1830, however, he saw himself forced to leave – almost flee – from the city following the Belgian secession. Along with many of his colleagues he found "refuge" as a professor by special appointment at his alma mater in Leiden. In 1835 he was appointed to the chair in geology and botany.

By this time he had established a reputation for himself as one of the finest minds in Dutch science, judging at least by the company he kept. He had been elected a member of the Royal Institute – the later Royal Academy – in 1827.[161] A fellow professor of his in Ghent was Thorbecke, who saw himself forced to move to Leiden in 1830 too – not unlikely, this was a key event in the lawyer's life that shaped his political outlook and his determination to push through reform in 1848. Either way, some degree of trust appears to have existed between van Breda and his colleague from the faculty of law, because when Thorbecke initiated a complete reorganisation of the Royal Institute in 1851 – in the process of which it was dissolved and re-established as the Royal Academy – van Breda was one of the two members who advised Thorbecke on how to revise the Academy's structure.[162] (The other was Gerrit Simons.)

By this time van Breda had taken on two other prestigious functions: he had not only succeeded van Marum as director of Teylers Museum in 1839 (after a lengthy squabble with the trustees on the exact terms of his contract and whether he was able to retain his chair in Leiden) but also as secretary of the Holland Society and director of its natural history cabinet.[163] Particularly his position as secretary would only have added extra clout to the advice he gave Thorbecke on the Royal Academy – much as van Marum's advice had been sought by Louis Napoleon when he established the Royal Institute some decades before.

At the same time, however, by the middle of the 19th century van Breda's star was beginning to wane. By the end of his career he was becoming something of an unloved dinosaur amongst Dutch scientists. Perhaps his behaviour as he got older had something to do with the fact that his life was marred by personal tragedy – his second wife died young, too, and four of his six children did not reach adulthood;[164] but two disputes at the Royal Academy go a long way towards explaining how van Breda lost much of his credibility and, perhaps even more importantly, his colleagues' goodwill later in life.

---

[161] Carel J. Matthes, "Levensberigt J.G.S. van Breda," in *Jaarboek van de Koninklijke Akademie van Wetenschappen* (Amsterdam: C.G. van der Post, 1867), 29.
[162] Berkel, *De Stem van de Wetenschap: Geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*, 1:285.
[163] For a contextualization and assessment of van Breda's work at the Holland Society see: Bert Theunissen, "Wetenschapsbeelden en de Hollandsche Maatschappij," in *Geleerden en leken: de wereld van de Hollandsche Maatschappij der Wetenschappen, 1840-1880* (Haarlem: Hollandsche Maatschappij der Wetenschappen, 2002), 33–46.
[164] Breure, "Biografie," 14.

The origins of the first dispute lay in van Breda's appointment to a commission that was tasked with drawing up a geological map of the Netherlands. [165] The commission was appointed by Thorbecke in 1852 and consisted of three of the Netherlands' most eminent scientists: the botanist Friedrich Anton Wilhelm Miquel, van Breda's former student of geology Winand Carel Hugo Staring and van Breda himself. Despite a promising start, they had reached an impasse in 1855. After a bitter and nasty dispute in public and vitriolic discussions at the Royal Academy – van der Willigen attended a meeting as a new member for the first time at the height of the animosities – it was decided that the only solution was to disband the commission.[166] Staring subsequently finished the work on his own, to great acclaim. As for the root causes of this bitter dispute, it has been suggested that the members' differences related "to diverging views on the scientific status of geology, its aims and its methods".[167]

The second dispute started in 1856, when the members of the Academy were asked to decide what the best shape was to give a lightning conductor that was to be placed on the roof of a mental institution.[168] Van Breda, who had not been included in the team of Academy members who were to find a solution, assailed their proposal. Eventually, this scientific dispute descended into something of a farce, with other members – not unjustly – accusing van Breda of merely invoking the authority of foreign physicists to support his criticism. His criticism was ignored, the device that was eventually fitted to the roof of the institution worked perfectly and van Breda was humiliated.

Even at Teylers, van Breda eventually left his position in discord with the trustees. Van Breda left because of old age, but the discord came about after he had left, because the trustees began to suspect that he had appropriated items from the Foundation's collections. These, of course, were quite serious allegations. The jury is still out as to whether they rang true. All that is known is that when van Breda's successor Winkler went to inspect his predecessor and former boss's collection in 1867, he could not find the specimens that were missing at Teylers and were supposedly now being stored at van Breda's, so that certainly gives van Breda the benefit of the doubt.[169]

If the trustees' suspicions were founded, it is almost bitterly ironic that van Breda's son subsequently tried to sell his father's geological collection to the Teyler Foundation after van

[165] On the commission, its work and the way it was disbanded see: Berkel, *De Stem van de Wetenschap: Geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*, 1:344–350; M. van den Bosch, "J.G.S. van Breda en de Commissie voor de Geologische Kaart 1852-1855," in *Leven en werken van J.G.S. van Breda (1788-1867)*, ed. A.S.H. Breure and J.G. de Bruijn (Haarlem: H.D. Tjeenk Willink, 1979), 267–402; Patricia E. Faasse, "W.C.H. Staring's Geological Map of the Netherlands," in *Dutch Pioneers of the Earth Sciences*, ed. Jacques L.R. Touret and Robert P.W. Visser, vol. 5, History of Science and Scholarship in the Netherlands (Amsterdam: KNAW, 2004), 129–138.

[166] For the final report on these altercations see: "Nota betreffende het Geologisch onderzoek van Nederland", 1855, Haarlem, NHA, Archief KNAW, vol. 64, nr. 213, fol. 26. For van der Willigen's election see: "Notulen Afdeling Natuurkunde", 29.03.1856, Haarlem, NHA, Archief KNAW, vol. 64, nr. 4, fol. 332.

[167] Faasse, "W.C.H. Staring's Geological Map of the Netherlands," 130.

[168] On the details of this dispute and its effects see: Berkel, *De Stem van de Wetenschap: Geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*, 1:350–353.

[169] A.S.H. Breure, "J.G.S. van Breda als Paleontoloog, privé en in Teylers Museum," in *Leven en werken van J.G.S. van Breda (1788-1867)*, ed. A.S.H. Breure and J.G. de Bruijn (Haarlem: H.D. Tjeenk Willink, 1979), 187.

Breda passed away in 1867. Because of the high asking price the trustees initially rejected the offer and most of the items ended up in the British Museum in London, although the Teyler Foundation did later purchase some of the specimens that were still available.[170]

4. "La collection, c'est moi" (and maybe Logeman and Winkler)

The fact that these allegations could surface and van Breda could not refute them offhand is indicative of another matter: van Breda did not see any real necessity to define a clear boundary between the Foundation's and his own, i.e. private, interests. He evidently did not feel he was fulfilling a job, but identified himself with the collection. One could perhaps caricaturise his attitude as "la collection, c'est moi". This way of identifying oneself with a collection would not have been at all unusual in the 18th and even at the dawn of the 19th century. But as collections were increasingly seen to fulfil a public – educational and identity-forming – function and were thereby seen to serve a set of ideals that transcended the personal, van Breda's attitude became increasingly out of date.

That van Breda made no distinction between his own interests and those of the Foundation is not to say that he did not care for the collection and the museum. On the contrary, he expanded them immensely and used his considerable intelligence and clout to their advantage, ensuring that they remained of high quality. It also doesn't mean he did not render them accessible: In March 1852 for instance he asked for and was granted

"permission [...] to have access to the Museum & the Library of this Foundation, with four trainees of the R. Academy at Delft [...] to enable them to complete their studies, and to use the Great Hall with these young men during the winter period, and to have this hall heated, to enable them to see selected objects."[171]

Van Breda also spent plenty of time on research of his own. He performed a series of physics experiments for instance and acquired the necessary equipment for this.[172]

He conducted these experiments together with Willem Martinus Logeman. Logeman is a somewhat enigmatic yet in all likelihood highly underrated figure, both in the history of Teylers Museum and in the history of Dutch physics. He is remembered chiefly for his skills as an instrument maker and the strong magnets he produced together with N. van Wetteren;

[170] Ibid., 187–188. For the initial offer and the trustees' refusal see: "Directienotulen", 04.10.1867 & 18.10.1867, Haarlem ATS, vol. 9.
[171] "toestemming [...] om met vier kweekelingen van de Kon. Akademie te Delft [...] den toegang te mogen hebben tot het Museum & de Bibliotheek dezer Stichting, tot voltoijing hunner studien, en gedurende dit winter getijde met die jongelieden, ter bezigtigin [sic] vande hun aantewijzen voorwerpen, gebruik te mogen maken van de Groote Zaal en dit vertrek alsdan te mogen laten verwarmen." "Directienotulen", 05.03.1852, Haarlem, ATS, vol. 9.
[172] On these experiments see: H.A.M. Snelders, "De bijdragen van J.G.S. van Breda tot de Natuurkunde," in *Leven en werken van J.G.S. van Breda (1788-1867)*, ed. A.S.H. Breure and J.G. de Bruijn (Haarlem: H.D. Tjeenk Willink, 1979), 91–131.

but not only his instruments, he himself was evidently also of incalculable value to research efforts like those of van Breda. In fact, for many years, he was an employee of the Teyler Foundation in all but name and "customarily submitted a monthly account for his time and expenses".[173] Yet almost no documents that could shed some real light on this individual's activities and his personality have been preserved.[174] What is known is that he taught mathematics and physics at various schools in Haarlem and went to great lengths to provide as many people as possible with access to scientific knowledge. He was a teacher at the local *Gymnasium* as from 1850 and later, after 1864, at the newly established HBS as well as at an evening school. He set up the association "Weten en Werken" in Haarlem, which had the aim of providing members of the working classes with possibilities to enhance their education. He also acted as the prime mover in the establishment of a number of popular science journals, the most prominent of which was a monthly publication with the title *Album der Natuur*. Logeman founded this together with Pieter Harting and Douwe Lubach.

Interestingly, he doesn't appear to have worked for the Teyler Foundation anymore after van der Willigen was placed in charge of the instrument collection. In 1876, when van der Willigen had been elected a member of Haarlem's town council, he appears to have voted against Logeman being appointed to a panel of experts who were supposed to advise the town's gas board.[175] This might point towards some kind of animosity between the two men.

But let us return to van Breda. Just like van Marum, he was a polymath and while he was obviously well-versed in the physics of his day, his main interest appears to have been geology. A comparison of his overall expenditures during his tenure at Teylers with the costs incurred by van Marum as director of the museum reveals that van Breda spent roughly the same amount of money as his predecessor, but that in van Breda's case the largest part of the money was spent on geological specimens.[176]

Most of the items van Breda purchased came from quarries in Solnhofen in Southern Germany and Oeningen in Switzerland. He had established a close business relationship with the owner of the latter quarry, Leonhard Barth – van Breda had first travelled to Switzerland in 1817 and returned in the early 1830s and 1852 – and was able to procure some of the best items discovered there.[177] Barth seems to have been a slightly shady figure, although van Breda appears to have tolerated his idiosyncratic business practices as long as they worked in his favour. The specific example from which this can be deduced concerns the geology professor Oswald Heer from Zurich, who was equally interested in what Barth unearthed and also corresponded with van Breda. Barth had struck a deal with Heer that he would sell him

[173] Turner, *The Practice of Science in the Nineteenth Century: Teaching and Research Apparatus in the Teyler Museum*, 13–14.
[174] For a thorough and comprehensive analysis of what is known see: O.H. Dijkstra, "Willem Martinus Logeman," *Jaarboek 1974 Haerlem* (1974): 138–159. A short but informative summary of his life is provided by: J.C. Ramaer, "Logeman, Wilhelmus Martinus," ed. P.C. Molhuysen and K.H. Kossmann, vol. 9, Niew Nederlandsch Biografisch Woordenboek (Leiden: Sijthoff, 1933), 616–618.
[175] This was at a council meeting held on 27.01.1876: *Verslagen van het Verhandelde in de Zittingen van den Raad der Gemeente Haarlem, 1876* (Haarlem: J. Enschedé & Zonen, 1876), 60–61.
[176] Breure and Bruijn, *Leven en werken van J.G.S. van Breda (1788-1867)*, 419–420.
[177] On van Breda's first journey south, his later travels, and his dealings with Barth see: Ibid., 75–90 & 177 & 177–189.

every item for 50 cents, on condition that Heer accept every item he was offered. This is perhaps in itself already an indication that Heer was not exactly business savvy, but what made the deal even worse was of course the fact that Barth was supplying van Breda with specimens from his quarry as well. It is not clear to what extent Heer was informed of Barth's dealings with van Breda, although he was clearly aware of the fact that van Breda was purchasing items off Barth.[178]

In ordering, cataloguing and caring for the geological collection van Breda was assisted by Tiberius Cornelis Winkler, who was later to succeed van Breda along with van der Willigen. In this sense the separation of the two scientific collections at Teylers Museum, which was to be formalised through the appointment of both Winkler and van der Willigen in van Breda's stead, was already discernible during van Breda's tenure at the museum: Logeman looked after the instruments, while Winkler took care of the geological specimens. It is striking how van Breda appears to have treated them as mere assistants – both were never formally employed to work for the museum, even if they were remunerated for their efforts. On the other hand one could also say that van Breda gave both of them their break: Logeman is sure to have profited from his association with Teylers Museum, financially and otherwise; Winkler – a self-made man with no university degree – was later promoted to the prestigious post of curator. Yet Winkler at least was slightly dismissive of his former boss, pointing out in what disorder he had found the collection after van Breda left.[179]

5. Confronted with New Ideas

But even if van Breda's handling of the collections that fell under his purview reflected more of an "old school" approach, that doesn't mean he didn't see himself directly confronted with newer ideas concerning the public role of museums. One revealing example, in which van Breda was dismissive of what he was presented with, occurred during the early phase of his work as a member of the commission that had been tasked with compiling a geological map of the Netherlands.

In order to understand what was going on, one needs to know that the Commission had been provided with a collection of geological specimens from all over the Netherlands. This collection was not inconsiderable; its core had been assembled from a variety of private and institutional collections and it was constantly expanded with specimens sent to the commission by so-called "correspondents" from all areas of the Netherlands. These new items then became state property. A major section of the original core collection consisted of items collected by Petrus Camper, which were now being looked after by the University of

[178] Breure, "J.G.S. van Breda als Paleontoloog, privé en in Teylers Museum," 177. Breure wrongly refers to Oswald Heer both as "Oskar" (p. 177) and "Otto" (p. 216) Heer.
[179] Tiberius C. Winkler, *Catalogue systématique de la collection paléontologique du Musée Teyler* (Harlem: Les Héritiers Loosjes, 1863), ii.

Groningen. All these specimens had been brought to Haarlem – a choice of venue that goes to show how van Breda was the one who was (as yet) calling the shots within the commission.

The collection was stored in two rooms on the ground floor of Paviljoen Welgelegen, i.e. the same building in which the *Rijksmuseum*'s paintings by living artists had been on public display since 1839. The section of the building the geological collection was now stored in had become available after King William II, who had still rented these rooms off the state, had passed away in 1849.[180] Staring was provided with living quarters in the same section of the building.

As from 1853, the geological collection was publicly accessible on Tuesdays and Saturdays between noon and 4pm. Tickets were available – apparently free of charge – from a certain "Mr Werdmüller von Elgg, at the front of the *Pavilion*".[181] (Werdmüller van Elgg was perhaps the building's caretaker.) A small guidebook – essentially a catalogue of what was on display – was available for visitors. A reason as to why it had been written was provided in the introduction to this booklet:

"[W]hat use or even pleasure, could be expected from walking around in a maze of rocks and names, in which even the trained geologist would, without assistance, find his way around only with difficulty?"[182]

As for the aim of the collection itself, according to the guidebook this was first and foremost

"so as to have together for detailed study everything that can serve to gain a correct conception of the types of rocks, minerals and remains of animals and plants that occur in the Netherlands; to explain the origin of the soil; to provide opportunity for further study of what has been examined once already;"[183]

Clearly, thus, it was conceived as a research and reference collection. The reason given as to why it was open to the public was

"to make the enterprise, if possible, into a general concern of the Netherlands, a concern in which everybody is interested who is not indifferent to the place his country occupies in the academic world, and to which everybody is invited to contribute for his part, if he is able."[184]

---

[180] Kok, "De musea in Paviljoen Welgelegen," 141.
[181] "Heer Werdmüller von Elgg, aan de voorzijde van *het Paviljoen*"; *De Geologie van Nederland: Handleiding vor de bezigtigers der verzameling op het Paviljoen te Haarlem* (Haarlem: A.C. Kruseman, 1853).
[182] "[W]elk nut, of zelfs genoegen, kon men verwachten van het rondwandelen in een doolhof van steenen en namen, waarin zelfs de gestudeerde geoloog zich, zonder hulp, met moeite eenen weg zoude weten te vinden?" Ibid., 3.
[183] "om alles voor eene naauwkeurige studie bijeen te hebben, wat dienen kan ten einde een juist begrip te verkrijgen van de rotssoorten, delfstoffen en overblijfsels van dieren en planten die in Nederland voorkomen; om het ontstaan van den bodem te verklaren; om gelegenheid te geven tot nader onderzoek van hetgene reeds eenmal beschouwd is geworden;" Ibid.
[184] "om […] de onderneming, zoo mogelijk, te maken tot de algemeene zaak van Nederland, tot eene zaak waarin een ieder belang stelt, wien 't niet onverschillig is welke plaats het vaderland inneemt in de wetenschappelijke wereld, en waarvoor een ieder uitgenoodigd wordt om, zoo hij daartoe in staat is, ook van zijne zijde bij te dragen." Ibid.

This was quite a far-reaching embrace of the public (note the explicit hope of garnering some input from "amateurs" and the strong emphasis of a sense of national pride so typical of the mid-nineteenth century) and one can safely assume that Staring carried most of the burden this brought with it, given that he was living in the same building.

However, as far as van Breda's attitude towards collections is concerned, the really revealing episode occurred the year before the guidebook was published, when one of the commission's "correspondents", Pieter Harting, expressed the hope that the commission's collection should form the core of something larger, or more specifically a "general Museum for Dutch geology". His somewhat longwinded letter is worth quoting at some length:

"What has been collected at excavations is of course State property, and I should therefore like to hear from you, what I should do with it when my research is finished. However, this doesn't apply to what I have collected there in the past at my own expense. I am not unwilling, however, to hand over that as well, namely if a central collection will be created, and individual members of the committee also deposit into it what they have collected from the soil earlier on.

In that case I will gladly follow the good example and retain nothing for myself, as *a general Museum for Dutch geology is by far to be preferred over a number of private collections* [emphasis MW]. What I have is not very much, but there are some important specimens amongst it, such as, for example, all the [...] shells from the Amsterdam soil. I have also some ground to believe, that others will be happy to hand over their special collections to such a general Museum as well, once the example in this respect has been given by the members of the Main Committee. They should therefore not hold it against me if, because of the importance of the matter, I intentionally [unreadable], and request them to be so good as to inform me of their views on this point. If they can agree with me on this most liberal view, then I have the greatest expectations of an open invitation to bring together what is present in many private collections, and the work could perhaps be furthered a great deal ..."[185]

But the Commission, led by van Breda, appears to have simply ignored this proposal. It would have been totally against van Breda's interests, too. Not only would a national museum of geology in Haarlem have undermined the importance of Teylers Museum, the way Harting's

[185] "Het bij de gravingen verzamelde is natuurlijk Rijkseigendom, en ik verlang derhalve van U.Gel. te weten, hoe ik, na afloop van mijn onderzoek, daarmede handelen moet. Dit geldt echter niet voor hetgene ik vroeger op eigen kosten aldaar verzameld heb. Echter ben ik niet ongenegen ook dit af te staan, wanneer er namelijk een centrale verzameling wordt aangelegd, en ook de individuele leden der commissie daarin het uit den bodem door hen reeds vroeger bijeen verzamelde willen deponeren. // In dit geval wil ik gaarne dit goede voorbeeld volgen door niets voor mij zelven te behouden, daar *een algemeen Museum voor Nederl. geologie verre de voorkeur verdient boven verscheidene particuliere collecties* [emphasis MW]. Wat ik heb is juist niet veel, doch er bevinden zich eenige belangrijke specimina onder, gelijk b.v. al de [...] schelpen uit den Amsterdamschen bodem. Ook heb ik eenigen grond om te geloven, dat ook anderen hunne bijzondere verzamelingen voor zulk een algemeen Museum gaarne zullen afstaan, wanneer eenmal daartoe het voorbeeld door de leden der Hoofdcommissie is gegeven. Zij houden het mij derhalve ten goede, indien ik dit punt om het gewigt der zaak, opzettelijk [...], en hen verzoek de goedheid te hebben mij zoo mogelijk daaromtrent hunne meening mede te deelen. Mogten zij zich met mij op dit meest liberale standpunt kunnen vereenigen, dan zoude ik mij van eene openlijke uitnodiging, tot tezamenbrenging van het reeds in vele particuliere collectiën voorhandene, veel goeds voorspellen en zoude welligt het werk zeer bevorderd kunnen worden..."; P. Harting to Commissie, 21.07.1852, as quoted in: Breure and Bruijn, *Leven en werken van J.G.S. van Breda (1788-1867)*, 286.

letter was phrased van Breda would in all likelihood have been expected to contribute items from his own personal collection to the new institution as well.

When the Commission was disbanded, the collections in Haarlem were initially sealed off. There was some debate as to whether they should be transferred to the Trippenhuis in Amsterdam, but they eventually remained in Paviljoen Welgelegen.[186] Staring was subsequently tasked with completing the geological map on his own and given full control over the collection in Haarlem. A first section of the map was published in 1858. When Staring moved to the town of Vorden in 1864, it was decided to transfer the geological collection to Leiden and incorporate it into the National Museum of Natural History. By this time Staring had assembled three times as many specimens as he had still listed in the guidebook some ten years earlier.[187]

Yet these no longer included a whole set of items from the Pietersberg in Maastricht, which had been sold to the Teyler Foundation in 1861 for a total of f6000,-. The largest part of this sum, f5000,-, was paid to the University of Groningen for specimens that had originally belonged to Camper, the rest of the money went to the state for specimens collected by Staring during his work on the geological map.[188] Van Breda fully supported this transaction – he first drew the trustees' attention to the possibility of a deal – and even offered to sell the Foundation his own collection, many parts of which would complement the other specimens from the Pietersberg, for about f10.000,-. He doesn't even appear to have been after any personal gain, as he simultaneously stated that he "would hand over [his collection] only reluctantly before he died".[189] Although one of the trustees was dispatched to discuss this proposal with van Breda, no reference is made to this offer in the final transaction with Staring and the University of Groningen. Staring, at least, was thanked

"[…] for his kind efforts to transfer the said collection into the possession of this Foundation, and for his [unreadable] concern for the safe transference of the objects from the Pavilion to the building of T.F. [the Teyler Foundation]"[190]

And despite all the acrimony brought about by the Commission and van Breda's later fallout with the trustees about the provenance of parts of his own collection, when the deal with Staring and Groningen was made, it was ultimately van Breda's work that had helped expand and enhance the collections at Teylers Museum.

Another, unrelated example of the way in which van Breda would have seen himself confronted with the changing role and status of museums can be found in his dealings with mineral traders: whereas the dealers van Marum had worked with and purchased items from still catered primarily to individual, rich collectors (i.e. "patrons"), by the middle of the 19th

[186] "Notulen Afdeling Natuurkunde", 27.09.1856, Haarlem, NHA, Archief KNAW, vol. 64, nr. 4, fol. 407-413.
[187] Kok, "De musea in Paviljoen Welgelegen," 141.
[188] "Directienotulen", 27.09.1861, Haarlem, ATS, vol. 9.
[189] "ongaarne [zijn collectie] vóór zijn overlijden zou afstaan"; "Directienotulen", 30.11.1860, Haarlem, ATS, vol. 9.
[190] "[…] voor zijn welwillende bemoeijingen om de bedoelde verzameling in eigendom aan deze Stichting te doen overgaan, en voor zijne aangeevende [unreadable] zorg voor het veilig overbrengen der voorwerpen van het Paviljoen naar het gebouw van T.St."; "Directienotulen", 21.02.1862, Haarlem, ATS, vol. 9.

century museums and other educational institutions had become major clients for mineral dealers, rivalling rich connoisseurs as a main source of income. What's more, in van Breda's correspondence concerning the acquisition of geological specimens, one regularly finds "science" equated with "the public good" and both are invoked as an argument as to why a particular item or collection should be sold to someone – or rather should not be, if it is in danger of no longer being publicly accessible. One example is provided by the German geologist Christian Erich Hermann von Meyer who, upon having sold van Breda a number of specimens in 1860, wrote:

"As difficult as it is for me to part with these important fossils, it is a reassuring feeling that the pieces on which my research is based, are now safely preserved for science in Teylers Museum; in smaller museums or in private collections they would have been lost sooner or later. The objects are worthy of Teylers Museum [...]."[191]

Of course it is questionable whether this type of argument really did carry much weight, or whether it wasn't just used to gloss over other matters and deliberations; but nevertheless, it is striking how "the public good" and whatever was seen to serve it (e.g. science) had become part of everyone's rhetorical repertoire.

Recall also how van Marum had still persuaded the trustees that he needed to go to Switzerland in order to acquire certain geological specimens directly "from the source" because they were not pleasing to the eye and therefore not readily available from mineral traders. In contrast, by the time van Breda worked at Teylers, traders were emphasising that the specimens they had on offer were precisely classified and proudly presented complete sets of specimens that illustrated classificatory systems.

6. The Rhenish Mineral-Office Krantz

A good example of the changes that had taken – and were taking – place is one of van Breda's most loyal suppliers, the "Rhenish Mineral-Office Krantz" (*Rheinisches Mineralien Comptoir Krantz*). This had been established by August Anton Krantz in 1833 when he was still studying in Freiburg, the German town famous for its mining academy.[192] He then set up shop in Berlin, but moved his headquarters to Bonn in 1850, "on account of the greater facilities

[191] "So schwer ich mich von diesen wichtigen Versteinerungen trenne, so ist es mir doch ein beruhigendes Gefühl, die Stücke die meinen Untersuchungen zu Grunde liegen, nunmehr im Teylerschen Museum auf sichere Weise der Wissenschaft erhalten zu sehen; in kleineren Museen oder Privatsammlungen würden sie früher oder später verloren gegangen seyn. Die Gegenstände sind des Teylerschen Museums würdig [...]." C.E.H. von Meyer to J.G.S. van Breda, 06.03.1860, Haarlem, ATS, vol. 2284.

[192] Krantz gave a very brief summary of his business in the introductory remarks to the following sales catalogue: *Verzeichniss von verkäuflichen Mineralien, Gebirgsarten, Versteinerungen (Petrefacten) und Gypsmodellen seltener Fossilien im Rheinischen Mineralien-Comptoir des Dr. A. Krantz in Bonn* (Bonn, 1855), iii.

offered by the latter town, both for collecting and exporting".[193] By this time he had built a huge network of clients and suppliers throughout the world and, by his own account, employed a "Staff of Collectors […] who are always "en route" through Europe, America, &c., and are zealous in securing all that is new or interesting to the Naturalist".[194]

His catalogues were squarely aimed at large, public institutions. That this was the case, but also the sort of status public institutions were beginning to enjoy, transpires from the following statement which Krantz included in the introduction to all of his later catalogues in some form or another:

"If at public institutions the available funds are insufficient to pay for the objects that are bought in one single payment, then payment in installments will be accepted with extended credit."[195]

Public institutions were evidently judged to be worthy of credit by default. Krantz's judgement in these matters was obviously sound and his business profitable, because it allowed him to have a magnificent villa built in Bonn when he moved there.[196] This building also served as the premises for his business and it is interesting to see how he included a fancy showroom. He invited van Breda to visit in 1851 – although there is no indication that van Breda took up the offer or the two men ever met. The invitation went as follows:

"That part of the house which will hold my collections […] will already be finished in 4 weeks time and I shall be happy to have the pleasure later on of showing you my well-displayed wealth of fossils and minerals."[197]

Krantz would of course not just have been looking for some friendly chitchat with van Breda, but was looking for business – one can therefore assume that his showroom was set up to underscore this aim and not just for his own or other people's pleasure, even if the one did not exclude the other. Some years later, in 1859, Krantz proudly proclaimed in his sales catalogue that his "collection of minerals comprising 11.000 specimens, arranged in 12 cabinets, including meteorites from 85 localities" was one of the finest collections in the world. As he put it:

"regarding the choice of items and number of species the same [Krantz' collection] surpasses all existing collections at all, regarding its wealth and partly its scientific value it should only

[193] *Catalogue of Mineralogical, Geological, and Palaeontological Specimens, Collections, Models &c., Dr. A. Krantz Bonn* (London: W. Clowes and Sons, 1855), 2.
[194] Ibid.
[195] "Gestatten bei öffentlichen Anstalten die verfügbaren Fonds nicht die Bezahlung für zu entnehmende Gegenstände auf einmal zu leisten, so werden bei ausgedehntem Credit Theilzahlungen gern bewilligt." *Verzeichniss von verkäuflichen Mineralien, Gebirgsarten, Versteinerungen (Petrefacten) und Gypsmodellen seltener Fossilien, im Rheinischen Mineralien-Comptoir des Dr. A. Krantz in Bonn*, 6th ed. (Bonn: Carl Georgi, 1859), v.
[196] Olga Sonntag, *Villen am Bonner Rheinufer, 1819-1914* (Bonn: Bouvier, 1998), 205–210.
[197] "La partie de ma maison qui tiendra mes collections […] devenir fini déjà en 4 semains et je serai bien heureux d'avoir après le plaisir de vous faire montre mes richesses fossils & Minerals bien exposées." A. Krantz to J.G.S. van Breda, 21.02.1851, Haarlem, ATS, vol. 2283.

be surpassed by the three public collections in Vienna, Berlin and that of the british [sic] Museum.“[198]

Although he acknowledges that they are better than his own collection, by invoking the names of these three public collections Krantz is of course placing himself on par with them. The reason he does so is because these public institutions – or rather public museums such as the British Museum – were not only deemed creditworthy, but were immensely prestigious in that they were seen to serve a higher ideal: that of science. Krantz was eager to avoid the impression that, rather than the advancement of science, what he sought to serve through his business was his own financial advancement. But it is striking to see how public collections and museums had become the benchmark for all those involved with scientific collections.

Indeed, Teylers Museum may have been smaller than the three collections enumerated by Krantz, but it was not seen as being entirely different in nature – even if it was privately owned. The geologist von Meyer who was already mentioned above can serve as crown witness here. Five years before writing the letter from which the quote above was taken, he had already been in correspondence with van Breda about another collection he wanted to sell because he had performed all the research he wanted on the specimens of which it consisted. He wrote van Breda:

“[...] that, in view of its importance and completeness, I will part only reluctantly with this fossil, and am inclined only to give it to a place where it will be preserved most safely for all times. I prefer Teylers Museum even over the British Museum in London and the collections in Paris, Munich and here, which would also have been keen to acquire this fossil. Towards the end of this week I will have finished with the depiction [of the fossil] and my research. ” [199]

Again, the absolute sincerity of his arguments can perhaps be doubted – he was, after all, conducting business – but nevertheless the structure of his argument and the fact that Teylers Museum was mentioned alongside other major public institutions is revealing enough. Most importantly, it suggests that the changing connotations of the word “museum” were not only affecting the way Teylers Museum was beheld with regard to its collection of fine art, but also with regard to its scientific collections.

---

[198] “systematisch in 12 Schränken aufgestellte Mineralien-Sammlung von 11000 Exemplaren inclusive Meteoriten von 85 Localitäten”; “[D]ieselbe übertrifft in Bezug auf Auswahl der Stücke und Anzahl der Arten alle vorhandenen Sammlungen überhaupt, in Bezug auf Reichthum und theilweise wissenschaftlichen Werth dürfte sie nur von den drei öffentlichen Sammlungen Wiens, Berlins und der des britischen Museums übertroffen werden.“ *Verzeichniss von verkäuflichen Mineralien, Gebirgsarten, Versteinerungen (Petrefacten) und Gypsmodellen seltener Fossilien, im Rheinischen Mineralien-Comptoir des Dr. A. Krantz in Bonn*, vi. [1859]

[199] “[...] dass ich mich von dieser Versteinerung, in Anbetracht ihrer Wichtigkeit und Vollständigkeit, schwer trenne und sie nur an einen Ort zu geben gesonnen bin wo sie für alle Zeiten am sichersten aufgehoben ist. Dem Teylerschen Museum gebe ich den Vorzug selbst vor dem Britischen Museum in London und den Sammlungen in Paris, München und hier, welche diese Versteinerung ebenfalls gern übernehmen würden. Gegen Ende dieser Woche werde ich mit der Abbildung under Untersuchung fertig werden.” C.E.H. von Meyer to J.G.S. van Breda, 04.06.1855, Haarlem, ATS, vol. 2284.

7. "Monuments of Science"

As far as the changing perception of the scientific collections – particularly the scientific instrument collection – is concerned, one of van Breda's earliest decisions with regard to the handling of the instruments can hardly be stressed enough and is therefore worth scrutinising in a little more detail.

Shortly after his arrival, van Breda wrote a four-page letter to the trustees, detailing what his plans were for the museum.[200] This obviously covered the instrument collection. He stated that he saw the collection as consisting of three categories. The first category he defined as those instruments that could still be used for research, the second he defined as encompassing those instruments that could not be used for research anymore because they had become outdated, and in the third category he put all the models or demonstratory apparatus that had been used for public lectures. This last group of instruments van Breda suggested one could get rid of; he was obviously not interested in using the models. The first category however van Breda wanted to keep, because he himself wanted to perform research at the museum – that was most likely the reason he had taken the job in the first place. But the second group of instruments he rather remarkably wanted to keep as well. His argument ran as follows:

"Those [instruments] of the second kind I judge that, although of little use value, they should be kept in the collection, they are to be regarded as monuments of science, and shall always be regarded with pleasure by every scientist [*Natuurkundigen*], who knows, how much they have contributed to the progress of science."[201]

So one can say that as from 1839 it became official museum policy at Teylers to preserve historical instruments.

It is not quite clear how rigorously van Breda followed up his own suggestion. It has already become clear that van Breda's primary concern at the museum was research. The instrument collection was, accordingly, first and foremost a working collection. This is reflected in the fact that far from every instrument ever acquired was preserved. Of the 434 instruments that van Marum included in the inventory of the collection he compiled probably in about 1822, as many as 181 are lost or unidentifiable.[202] Van Breda had of course himself announced that he wanted to dispose of all models and demonstratory apparatus in the collection, but other instruments are no longer in the collection either. The entire collection of barometers was disposed of, for instance. It is not clear when and why all these instruments were sold off, the available documentation provides only sporadic evidence. One such piece of evidence dates from September 1862, i.e. from some twenty years after van Breda wrote the letter quoted

[200] J.G.S. van Breda to Directeuren, 28.08.1839, Haarlem, ATS, vol. 23.
[201] Ibid.
[202] Gerard l'Estrange Turner translated and transcribed an inventory compiled by van Marum and marked which instruments were unidentifiable in Teylers' collection. Turner tentatively dated the inventory to 1812, but Marijn van Hoorn was recently able to show that it must have been compiled later, probably in about 1822. The translated inventory was published in: Gerard L'E. Turner and Trevor H. Levere, "Van Marum's scientific instruments in Teyler's Museum," in *Martinus van Marum: Life and Work*, vol. 4 (Leyden: Noordhoff International Publishing, 1973).

above: van Breda received permission from the trustees to sell or dispose of "a large number of outdated physical instruments".[203] In all likelihood he did so, too, and if not on this occasion then on others, because he is also known to have used instruments for his own research which never turned up in any of the museum's inventories.[204] Finally, there were other ways in which the amount of objects in the collection was reduced: in 1867, under van der Willigen's watch, an air pump was donated to the recently established HBS in Haarlem.[205]

Nevertheless, van Breda's statement that he intended to keep instruments of historical value is made at a remarkably early time, when this was by no means self-evident. It may be recalled that the Conservatoire des Arts et Métiers in Paris had already taken a similar decision in 1801, but this did not, by any means, catch on and in the Netherlands the earliest known example of an instrument being purchased and treasured simply for its historical value is from the exact same time: in 1838, Frederik Kaiser bought a telescope attributed to Petrus van Musschenbroek for the Observatory of Leiden University. This acquisition was later put on display at the Observatory in Leiden alongside a small number of other astronomical instruments he considered to be of historical interest.[206]

What's more, there is no reason to believe that van Breda ever changed his stance and ceased to appreciate many of the instruments acquired by his predecessor. Not just the electrostatic generator – clearly an integral part of the Foundation's and the Museum's identity – but many smaller instruments too were never disposed of. This in turn meant that van der Willigen was handed down a collection of scientific instruments that consisted, to a considerable extent, of historical instruments.

This – together with van der Willigen's own definition of physics and his tasks as curator, but also the broader developments taking place with regard to museums and science – was a crucial factor in determining how the entire collection was perceived and handled by the end of the 19th century.

[203] "Directienotulen", 26.09.1862, Haarlem, ATS, vol. 9: "Wordt besloten, een groot aantal verouderde physische werktuigen, tot Teijlers Museum behoorende, welke ook door den Hr. van Breda, directeur van het Museum, voor onbruikbaar en thans onnuttig verklaard zijn, opteruimen & bij daartoe voorkomende geschikte gelegenheid te gelde te maken."
[204] Huib J. Zuidervaart, "Verloren instrumenten uit het kabinet van Teylers Museum in het midden van de negentiende eeuw," *Teylers Magazijn* 96 (2007): 6–11.
[205] "Directienotulen", 07.06.1867, Haarlem, ATS, vol. 9.
[206] Zuidervaart, "Frederik Kaiser (1808-1872), een gekweld man met een missie," 26–27.

V. Volkert Simon Maarten van der Willigen (II): Curator in Haarlem

1. On the Job

Having now illustrated how Teylers Museum and the world around it had changed over the years preceding van der Willigen's arrival in Haarlem, we can turn to his activities during his curatorship.

Unfortunately, very little material that could throw some light on the precise reasons for his appointment has been preserved. However, taking into account all that was said above, it should not come as much of a surprise that the trustees chose van der Willigen, either: he was eminently well qualified in that he had an excellent track record as one of the country's best physicists, espousing a modern methodology; he was familiar with one of the country's better collections of scientific instruments; and he was available because of the restructuring of the Athenaeum in Deventer.

The position was definitely sought after, though, as the following episode illustrates. Van Breda did not only resign as director of Teylers Museum in 1864, but also as secretary of the Holland Society and director of its natural history cabinet. His successor at the Society was Edouard Henri von Baumhauer, professor of chemistry and pharmaceutics in Amsterdam. Shortly after his appointment he submitted a request to the Directors of the Holland Society, which was heavily discussed at a sequence of meetings. The details both of von Baumhauer's request and of the ensuing discussions have not been preserved – all documents pertaining to this matter were removed from the Society's archives. The only thing that is clear is that von Baumhauer's request was related to van der Willigen's appointment. More to the point, he had evidently been hoping that he would succeed van Breda at Teylers as well and – crucially – that he would be able to use the laboratory facilities there to continue with his chemical research.[207] This gives one an idea just how much of a gem the research facilities at Teylers were considered amongst researchers at the time. It is clear that the post of curator was therefore highly sought after. Recall also how this was before laboratories were established at HBS schools all over the country. University laboratories were not as well equipped as the laboratory at Teylers, either. They only surpassed the facilities in Haarlem at the beginning of the 20th century – a point to which we shall return in the next chapter.

Incidentally, the Society's cabinet was dissolved soon after van Breda had left – it had evidently been left in some neglect for a while and in 1866 most of the specimens it housed were sold to *Artis*, a natural history society that had been established in Amsterdam some decades before and gained particular prominence through the publicly accessible zoo it ran.[208]

[207] On this request and what it elicited see: Johan A. Bierens de Haan, *De Hollandsche Maatschappij der Wetenschappen, 1752-1952* (Haarlem: Tjeenk Willink & Zoon, 1970), 109–111.
[208] On *Artis* see: Donna C. Mehos, *Science and Culture for Members Only: The Amsterdam Zoo Artis in the Nineteenth Century* (Amsterdam University Press, 2006). On the dispersal of the Holland Society's cabinet see:

Much like the separation of the geological collection and the scientific instrument collection at Teylers, the dispersal of the Holland Society's cabinet is indicative of the changing status of collections, both for researchers and for the lay public. Both van Breda and van Marum had been in charge of a set of collections that essentially spanned the entire natural sciences, i.e. physics, chemistry, natural history and geology. In a sense they were therefore in charge of one, large, all-encompassing "encyclopaedic" museum which happened to be spread out over two venues (or three, if one sees the Teyler Foundation's laboratory as distinct from Teylers Museum) and which happened to be financed by two institutions. Van der Willigen and Winkler, on the other hand, were entrusted with running a specialised research collection that was restricted to their own research within a specialised field of science. This is worth keeping in mind when trying to understand how the collection of scientific instruments in particular was perceived in relation to other collections.

2. Van der Willigen's Work in Haarlem

As for van der Willigen, once he got the job at Teylers it must have become clear to all that, just like van Baumhauer, he was interested first and foremost in performing experimental research. Generally speaking he pursued exactly the same lines of research he had already devoted time to in Deventer. The first summer after his appointment at Teylers he even returned to the north of the Netherlands, to Twello, to complete a series of experiments he had begun there.[209] He also brought some instruments to Haarlem with him from Deventer. At least one set of diffraction gratings by Nobert was acquired by the Teyler Foundation from the Deventer Society for Physics and Chemistry.[210] Needless to say, all his experiments were performed with huge precision and attention to possible sources of inaccuracies and errors.

One area of research he was evidently particularly intrigued by was optics.[211] Recall how his dissertation with Kaiser had already covered the aberration of light. His first project at Teylers was to establish the exact wavelength of all visible sunlight, much as Ångström did. He also published a graph of the visible portion of the solar spectrum, apparently achieving higher precision than Fraunhofer had. Having completed this work van der Willigen turned to the measurement of the refractive indices of various materials and solutions, paying special attention in how far they were influenced by the translucent materials' temperature. His aim was thereby to deduce the precise correlation of the wavelength of light and a material's refractive index.

Bert Sliggers and Marijke H. Besselink, eds., *Het verdwenen museum: natuurhistorische verzamelingen 1750-1850* (Haarlem: Teylers Museum, 2002), 127–129.

[209] Volkert Simon Maarten van der Willigen, "Mémoire sur la détermination des longueurs d'onde du spectre solaire," vol. 1, Archives du Musée Teyler (Harlem: Les Héritiers Loosjes, 1866), 4–5.

[210] Turner, *The Practice of Science in the Nineteenth Century: Teaching and Research Apparatus in the Teyler Museum*, 152–153.

[211] Unless otherwise indicated, the following summary of van der Willigen's research activities at Teylers is based largely on: Bakhuyzen, "Nekrolog: Volkert Simon Maarten van der Willigen," 101–106.

It was within the context of this research that he also proposed using a specific wavelength of light as a reference point for a standard unit of length. He had already established that the wavelength of light always remained constant, and did not, as was commonly assumed, depend in any way on the speed of the light source itself. This in turn led to his extensively discussing Doppler's theories, proposing that certain analogies between light and sound could not be made. Here, as of course in all of his theories on light, "aether" still played a central role. Although van der Willigen's idea to define a standard unit of length using the wavelength of light is testimony of his capability of far-reaching insights, he did not know that this had already been suggested some years earlier by Johann von Lamont and, as in all other areas he worked in, the honour of a groundbreaking discovery eluded him.

This idea for a new definition of a standard unit of length seems to underscore Gerard Turner's conclusion that all van der Willigen's research at Teylers had been linked to one theme, the establishment of a standard length.[212] Turner concluded this mainly on the basis of van der Willigen's acquisition policy. He pointed out that the acquisition of a reversible pendulum by Repsold and a chronometer by Hohwü, combined with other instruments van der Willigen had acquired earlier for the collection, would indeed have enabled him to establish the length of a seconds pendulum, which is one way of establishing a standard length. What's more, Turner added, Ångström had used the standard metre of Uppsala, which however gained notoriety for being 0,13mm too short, for his work on the solar spectrum which was published in 1868. Perhaps van der Willigen was hoping to improve on this work.

But van der Willigen was involved in other areas of research as well. One other project to which van der Willigen devoted some time was the precise measurement of a Foucault Pendulum's movements. And in the late 1870s van der Willigen began to show an interest in magnetism and experimented with strong magnets. In a way he thereby continued work that both his predecessors at Teylers had already spent time on. Van der Willigen cooperated with van Wetteren and his associate Elias. These were the instrument makers Logeman had been in business with. Logeman, however, had left the company in 1860.[213]

All this, incidentally, does not provide any further indication as to why van der Willigen had the small laboratory building which was mentioned at the beginning of this chapter constructed in the museum's garden.

Van der Willigen published the results of his research in a variety of journals.[214] One of these was the Dutch Royal Academy's Proceedings (*Verslagen en Mededeelingen der Koninklijke Akademie van Wetenschappen te Amsterdam – Afdeeling Natuurkunde*). It has been pointed out that van der Willigen was pretty much the only member of the Academy of his generation who published papers based on experimental research and that his papers also constituted pretty much the only contribution the Academy delivered to physics during this period of its

[212] Turner, *The Practice of Science in the Nineteenth Century: Teaching and Research Apparatus in the Teyler Museum*, 14–17.
[213] Dijkstra, "Willem Martinus Logeman," 149.
[214] For a full list of van der Willigen's publications see: Bakhuyzen, "Nekrolog: Volkert Simon Maarten van der Willigen," 106–111.

history.[215] He was also a frequent contributor to the prestigious *Annalen der Physik und Chemie*, edited by the infamous (amongst contemporary scientists) Johann Christian Poggendorff.

Finally, many of van der Willigen's articles were printed in the *Archives du Musée Teyler*. This journal, paid for by the Teyler Foundation, had been set up in 1868. As a short statement printed on the first pages of the first edition of the *Archives* revealed:

"The Archives of Teyler's Museum will appear from time to time in installments, which will contain scientific memoirs and the annual acquisitions of the Library and of the Palaeontological collections, etc, of the Museum."[216]

In other words, the *Archives* were to serve as a medium through which research that had been performed with the museum's collections could be published. Although the minutes of the Teyler Foundation's trustees' meetings do not provide any information as to why this journal was created or who was the driving force behind its establishment, it can be seen as yet another symptom of the specialisation of the sciences during this period. More to the point, the role of learned societies – particularly privately funded learned societies – had dwindled by the 1860s. Tellingly, for instance, the amount of essays that was submitted in reply to the prize essay competitions still held by Teylers Second Society in accordance with the stipulations of Pieter Teyler's will had been in sharp decline. After 1866, only a handful of *Verhandelingen* could ever be published by the Second Society. (Although the Theological Society did, admittedly, still receive more entries.)[217] Generally speaking, prize essay competitions as a medium through which to publish the results of research efforts had been replaced by publications in specialised journals (such as Poggendorff's *Annalen*).

Van der Willigen appears to have had high hopes for the *Archives*, but they were not fulfilled: in the introductory remarks to one of his articles he laments – perhaps somewhat naïvely – that the authors of a research paper published by the French *Académie des Sciences* had recently failed to refer to his work on spectrography, even though he had sent the Academy the first edition of the *Archives*, containing his most recent work on this topic.[218] Instead, he complained, the French Academy had praised a Frenchman for his recent groundbreaking work. Nevertheless, the *Archives* were widely circulated – mainly in an exchange of publications with other societies – and there appears to have been a great deal of interest in

[215] Berkel, *De Stem van de Wetenschap: Geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*, 1:337 & 341.
[216] "Les Archives du Musée Teyler paraîtront de temps à temps en cahiers successifs, qui contiendront des mémoires scientifiques et les augmentations annuelles de la Bibliotheque et des collections Paléontologiques etc. du Musée." "Avis," vol. 1, Archives du Musée Teyler (Harlem: Les Héritiers Loosjes, 1866).
[217] For a list of all *Verhandelingen* of Teyler's Learned Societies published before 1978 see: *"Teyler" 1778-1978: studies en bijdragen over Teylers Stichting naar aanleiding van het tweede eeuwfeest.* (Haarlem; Antwerpen: Schuyt, 1978), 37–55.
[218] Volkert Simon Maarten van der Willigen, "Rapport servant de premier supplément au mémoire sur la détermination des longueurs d'onde du spectre solaire," vol. 1, Archives du Musée Teyler (Harlem: Les Héritiers Loosjes, 1866), 62.

them. The first edition at least had to be reprinted because demand was higher than expected.[219]

Another time-consuming and significant contribution of van der Willigen's to the body of science – alongside his own experimental research – was his work as coordinator of a Dutch astronomical expedition to the island of Réunion in the Indian Ocean to record the transit of Venus in 1874.[220] Although he did not travel with the researchers, van der Willigen had volunteered to coordinate this expedition in the name of the Dutch Royal Academy and cooperated with teams from other countries that had embarked on similar undertakings and were based in the vicinity. In fact van der Willigen had not only volunteered to coordinate this project, but had even initiated the expedition, which is all the more remarkable because shortly before he died in 1872 his mentor Frederik Kaiser had warned his fellow members of the Academy that participating in the international flurry of activity the transit caused was not worth the effort for a small country such as the Netherlands.[221] This, together with the hard work coordinating the expedition had required, must have made it even more disappointing for van der Willigen when the expedition failed, for the simple reason that it was cloudy on Réunion on the day of the transit. Once again, the potential glory of a successful and unique scientific endeavour had eluded van der Willigen. Although, perhaps in recognition of his efforts, he was made a member of the *Astronomische Gesellschaft* the following year.[222]

By the time the expedition was undertaken, van der Willigen had taken on another task in Haarlem: he had been elected a member of the town council in 1872. Political parties did not exist in the Netherlands yet at this point, but only informal political "clubs", the *kiesverenigingen*, and these also played a role in this election; both the *kiesverenigingen* that recommended candidates to their members in the local newspaper the day before the election, the "Kiesvereniging Eendracht" and the "Kiesvereniging Regt voor allen", did not however support van der Willigen, but recommended his opponents.[223] Nevertheless, van der Willigen was elected in a second round of elections on July 30th 1872, with a majority of 313 votes out of a total of 545 cast, and remained a member of the town council until his death in 1878.[224] He was even elected one of the deputy chairmen of the council in 1874.

What is most striking about his contributions to council meetings as they were recorded in the official minutes is that he spoke out almost only on issues pertaining to matters of education, such as the appointment of school personnel or administrative matters.[225] Occasionally he was involved in other activities, mostly where scientific expertise was of help, such as drafting

[219] "Directienotulen", 06.11.1874, Haarlem, ATS, vol. 10.
[220] On this expedition see: Rob van Gent, "De Nederlandse Venusexpedities van 1874 en 1882," *Zenit* 20 (1993): 332–337; *De reizende astronoom: Nederlandse sterrenkundige expedities naar de Oost en de West* (Leiden: Museum Boerhaave, 1993). Van der Willigen is not mentioned in both articles.
[221] Berkel, *De Stem van de Wetenschap: Geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*, 1:416.
[222] Bakhuyzen, "Nekrolog: Volkert Simon Maarten van der Willigen," 106.
[223] *Haarlemsche Courant*, no. 166, 16.04.1872
[224] "Gemeentebestuur Haarlem 1813-1957", Haarlem, NHA, vol. 1323.
[225] One example is the establishment of new rules concerning all schools in Haarlem at a meeting of the council on 21.12.1877, as recorded in: *Verslagen van Het Verhandelde in de Zittingen van Den Raad Der Gemeente Haarlem, 1877* (Haarlem: J. Enschedé & Zonen, 1877).

new contracts with the town's gas supplier for instance, but by and large he only showed real passion for matters of education.

3. Public Lectures & the Centennial in Philadelphia

This interest and commitment to matters pertaining to education chimes well with what has already transpired from the analysis of his time in Deventer: while van der Willigen emphasised the distinction between specialists and amateurs, he showed great willingness to further the diffusion of specialist knowledge amongst amateurs. This attitude, in turn, is important to keep in mind when trying to understand how van der Willigen saw and handled the scientific instrument collection at Teylers.

Apart from his involvement in questions that had to do with public education as a member of Haarlem's town council, there are other examples that indicate that van der Willigen's enthusiasm for the public diffusion of scientific knowledge did not wane once he had been taken on as curator in Haarlem. One of these is that he took the public lectures he was required to hold according to his contract seriously enough to acquire a valuable set of acoustic apparatus manufactured by the Parisian instrument maker Karl Rudolph Koenig. These devices don't seem to have been related to his research efforts in any way, but served purely for demonstration purposes.[226] Another example is directly related to these lectures, too: in 1875, the decision was taken to expand their audience significantly. Rather than restricting access to the trustees and the members of Teylers Learned Societies, it was decided that van der Willigen and his fellow curator Winkler could distribute over a hundred tickets to whomever they pleased, to "both women and men".[227] Each trustee was allowed to distribute 5 tickets and the members of the Societies were expected to attend the lectures as well. The audience totalled 150 and a new venue, outside the Teyler Foundation's premises, was agreed upon for the lectures: the "Societeit de Vereeniging". In how far van der Willigen was involved in these decisions is unclear, but there is certainly no evidence to show that he opposed them, either.

Most importantly, though, van der Willigen was the first curator on whose watch instruments from Teylers Museum's collection were sent abroad to be displayed at international exhibitions. This of course rendered them accessible to a far larger audience than if they had remained in Haarlem. What's more, by placing them in a different context different qualities could be – and were – attributed to the instruments on display. They were increasingly appreciated for their historical value, for instance.

---

[226] Turner, *The Practice of Science in the Nineteenth Century: Teaching and Research Apparatus in the Teyler Museum*, 17.
[227] "zoowel vrouwen als mannen"; "Directienotulen", 24.09.1875, Haarlem, ATS, vol. 10.

The first international exhibition Teylers and van der Willigen were involved in was the Centennial in Philadelphia. This was essentially a huge trade fair, emulating the 1851 Great Exhibition in London, and was organised to celebrate the 100th anniversary of the signing of the American Declaration of Independence in Philadelphia and to showcase the technological achievements of the budding and increasingly influential United States of America. At the time, this young nation was still healing from the discord and destruction wrought by the American Civil War a little over a decade earlier.[228]

The Dutch government initially had strong reservations about participating. An earlier international exhibition held in New York in 1853 had apparently had "disastrous effects" for the contributors, and there was some scepticism about the rapid succession of international exhibitions, or World's Fairs.[229] These sentiments were expressed on the very first page of the final report on the Dutch display at the Centennial:

"Whether this quick succession of world exhibitions, each of which attempts to surpass its predecessors in extent and splendour, is desirable and corresponds to the conception of the great initiator of the exhibitions, the late Prince Albert of England, is very much to be doubted;"[230]

Nevertheless, the decision was taken to participate with an officially sanctioned Dutch display – apparently also in order to avoid private individuals filling the void and giving the impression they represented the Netherlands[231] – and von Baumhauer, the secretary of the Holland Society and also a member of Haarlem's town council, was tasked with coordinating the Dutch display.

The Centennial was ultimately considered a success with more than 10.000.000 visitors attending.[232] Much like the Great Exhibition, it provided an impetus for the American museum world, with a lasting effect on the museums of Philadelphia and with the Arts and Industries Building being constructed in Washington to house exhibits from the Philadelphia show – this was the first building to be built for the Smithsonian Institution after "the Castle".[233] As for von Baumhauer, his work has been described as the "climax of his career".[234]

Interestingly, Dutch instrument makers seem to have been reluctant to participate and were accordingly underrepresented. The only exceptions, according to the organising committee's

[228] On the exhibition see for instance: Giberti, *Designing the Centennial: a History of the 1876 International Exhibition in Philadelphia*.
[229] "noodlottige gevolgen"; *Verslag aan Zijne Excellentie den Minister van binnenlandsche zaken over de Nederlandsche Afdeeling op de Internationale Tentoonstelling, gehouden te Philadelphia van 10 Mei tot 10 November 1876* (Haarlem: De Erven Loosjes, 1877), 2.
[230] "Of deze spoedige opvolging van wereldtentoonstellingen, waar telkens de nieuwe haar voorgangsters in uitgebreidheid en pracht tracht te overschaduwen, gewenscht is en beantwoordt aan het denkbeeld van den grooten stichter der tentoonstellingen, wijlen Prins Albert van Engeland, mag zeer worden betwijfeld;" Ibid., 1.
[231] Ibid., 3.
[232] Giberti, *Designing the Centennial: a History of the 1876 International Exhibition in Philadelphia*, 210.
[233] On the lasting impact of the "Centennial", particularly on Philadelphia, see: Ibid., 175–225.
[234] "Hoogtepunt van zijn carrière"; Berkel, *De Stem van de Wetenschap: Geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*, 1:329.

final report, were "our famous Chronometer makers" and "The well-known Haarlem magnet manufacturer, the Bros. Van Wetteren". The latter were awarded a prize by the Centennial's jury "[f]or the manufacture, under the supervision of Prof. van der Willigen, of powerful magnets, composed of plates."[235] According to a guidebook to the instrument collection at Teylers Museum written by van der Willigen's successor Elisa van der Ven in 1898, his predecessor had contributed to the exhibition in Philadelphia in another way too, by sending in a "collection of prisms, made of flint glass, spar and quartz".[236] According to van der Ven, this had earned an "honourable mention".[237] Strangely enough, however, this is not backed up by the official list of exhibits which were awarded prizes, as provided in the Dutch organising committee's final report.[238] What is incontrovertible, though, is that the Teyler Foundation sent in copies of the *Archives*. These were not only displayed in the section "Education" (*Opvoeding en Onderwijs*), but also won a prize for the "[g]eneral excellence of the display" and were subsequently donated to the Smithsonian Institution.[239]

4. The Special Loan Collection at South Kensington

But while the world's attention was focused on the Centennial in North America, another major, international exhibition was taking place in London. This was the Special Loan Collection of Scientific Apparatus. It is fascinating to see how various strands of history merged here and, in as far as the overall status of scientific instruments at Teylers Museum and in other collections is concerned, the Special Loan Collection is actually of far greater importance than the Centennial.

The reason is that the organisers of the Special Loan Collection – the Committee of Council on Education – had the ambition of organising more than one of "the numerous Industrial Exhibitions which have been held in various countries", as they explained in the Catalogue accompanying the exhibition.[240] They elaborated that these "[Industrial] Exhibitions appeal

---

[235] "onze beroemde Chronometermakers"; "De bekende Haarlemsche magnetenfabrikant, de Gebrs. Van Wetteren"; "Voor de vervaardiging, onder opzicht van Prof. van der Willigen, van krachtige magneten, samengesteld uit platen." "Officieele Lijst Der Bekroonde Nederlandsche Inzenders," in *Verslag Aan Zijne Excellentie Den Minister van Binnenlandsche Zaken over de Nederlandsche Afdeeling Op de Internationale Tentoonstelling, Gehouden Te Philadelphia van 10 Mei Tot 10 November 1876* (Haarlem: De Erven Loosjes, 1877), 24.

[236] "collectie prisma's van flintglas, spath en kwarts"; Elisa van der Ven, *Gids door de Verzameling Physische Instrumenten in Teyler's Museum* (Haarlem: De Erven Loosjes, 1898), 14. The items in question are listed under cat.-no. 543 in: Turner, *The Practice of Science in the Nineteenth Century: Teaching and Research Apparatus in the Teyler Museum*, 145.

[237] "eervolle vermelding"; Ven, *Gids door de Verzameling Physische Instrumenten in Teyler's Museum*, 14.

[238] "Officieele Lijst Der Bekroonde Nederlandsche Inzenders."

[239] "Algemeene voortreffelijkheid van het tentoongestelde"; For the prize see: Ibid., 38. For the donation see: Ibid., 72.

[240] *Catalogue of the Special Loan Collection of Scientific Apparatus at the South Kensington Museum*, 3rd ed. (London: Eyre & Spottiswoode, 1877), xiii.

naturally, more or less exclusively, to the industrial or trade-producing interests" of the countries involved in the Exhibition and continued:

"This was not the idea of the proposed Loan Collection at South Kensington. For that Collection it was desired to obtain not only apparatus and objects from manufacturers, but also objects of historic interest from museums and private cabinets, where they are treasured as sacred relics, as well as apparatus in present use in the laboratories of professors."[241]

Recall how, some 40 years earlier, it had still been exceptional that van Breda had decided not to dispose of many of the instruments acquired by van Marum. By the 1870s, appreciation for the material witnesses of the history of science was evidently on the rise.

Just as strikingly, the Committee's aim in organising this exhibition was to initiate "the creation of a Science Museum".[242] Again, this was stated quite forthrightly in the catalogue to the Special Loan Collection, in the description of one of the Committee's first meetings:

"Their Lordships [of the Committee] stated their conviction that the development of the Educational, and certain other, Departments of the South Kensington Museum, and their enlargement into a Museum somewhat of the nature of the *Conservatoire des Arts et Métiers* in Paris, and other similar institutions on the Continent, would tend to the advancement of science, and be of great service to the industrial progress of this country."[243]

The next sentence, however, proved more decisive:

"While expressing their hope that the Loan Collection might forward this desirable object, their Lordships guarded themselves against committing Her Majesty's Government, which had not yet fully considered the subject, to any definite scheme."

In other words, there was no money available. In fact it was going to take more than three decades before an independent "Science Museum" was created out of parts of the South Kensington Museum's collections in 1909.

Nevertheless, the fact that these sentiments were being expressed so clearly at this point in history and that the Special Loan Collection was held at all can be seen as the culmination of a variety of developments in history that now began to have a strong bearing on the way in which scientific instruments – or instrument collections – were displayed and perceived. Firstly, there was the growing authority of "science": not only had this come to be seen as one of the root causes for Western societies' recent rapid progress, it had also come to be seen as an area in which it was worth pursuing a career. Secondly, there was the tradition of the World's Fairs, or "International Industrial Exhibitions", as the Committee would have phrased it: even though the Special Loan Collection was supposed to be different, the World's Fairs still acted as a foil for it. Thirdly, there was the – intended – venue: the South Kensington Museum; it was only because of "various circumstances, which could not be foreseen"[244] that

[241] Ibid.
[242] Ibid., xi.
[243] Ibid.
[244] Ibid., xviii.

the Special Loan Collection was held in galleries nearby.[245] Fourthly, there was the notion that a Museum – with a capital "M" – that had been established through the expansion of another Museum's "Educational Department", could serve the "advancement" of science. Clearly, museums were strongly associated with permanent, public, educational exhibitions.

At least it is crystal clear that this was now the case in England. But the ideas developed by the Committee of Council on Education in London were evidently not met with any form of resistance or considered overly strange in the Netherlands, either – or there would have been no reason to form a Dutch committee tasked with ensuring that instruments were sent in from the Netherlands and consisting of some of the most eminent scientists of their day.

More to the point, van der Willigen was a member of this commission and the Teyler Foundation contributed both historical items from its collections and apparatus that van der Willigen had recently used in his research. (Some of the other members of the commission were Buys Ballot and Bosscha jr. It was presided over by Pieter Leonard Rijke, who held the chair in physics at the University of Leiden.[246]) According to the catalogue, of the instruments the Teyler Foundation submitted, those van der Willigen had recently used were: a collection of prisms, six Nobert refraction gratings, artificial magnets produced by van Wetteren, a ring developed by Elias for the magnetisation of artificial magnets and a vacuum tube for electric discharge.[247] Instruments that were clearly of historical value were: a large natural magnet acquired in 1810, a Leyden jar and Leyden battery used by van Marum, two repulsion electrometers made by van Marum and a terrestrial refractor made by the Amsterdam instrument maker van Deyl in 1781.[248] To top off this selection, the Foundation also submitted all three volumes of the *Archives* thus far published.[249]

In a remarkable demonstration of his historical awareness, in the explanatory caption accompanying the description of the 18th century Leyden Jar which van der Willigen wrote for the catalogue to the exhibition, he reported that its "coatings of tinfoil have been renewed recently; but all is restored in the form in which it was used by Van Marum".[250] In other words, van der Willigen had had the Leyden Jar restored – not just repaired – shortly before the Special Loan Collection. This is a clear indication that, while his primary focus was research and van der Willigen was constantly expanding the Foundation's instrument collection to this end, he was well aware of the historical value of the items in the collection that his predecessors had left him.

In fact the caption in the catalogue explaining why the *Archives* had been submitted insinuates that, had it been transportable, the Foundation and van der Willigen would even have been

[245] Peter R. de Clercq, "The Special Loan Collection of Scientific Apparatus, South Kensington, 1876, Part 1: The 'Historical Treasures' in the Illustrated London News," *Bulletin of the Scientific Instrument Society* no. 72 (2002): 11.
[246] *Catalogue of the Special Loan Collection of Scientific Apparatus at the South Kensington Museum*, xvi.
[247] Ibid., 209 & 229 & 280 & 285 & 322.
[248] Ibid., 279 & 319 & 328. Cf. Peter R. de Clercq, "The Special Loan Collection of Scientific Apparatus, South Kensington, 1876, Part 2: The Historical Instruments," *Bulletin of the Scientific Instrument Society* no. 73 (2002): 14.
[249] *Catalogue of the Special Loan Collection of Scientific Apparatus at the South Kensington Museum*, 1064.
[250] Ibid., 319.

willing to include the Cuthbertson electrostatic generator in the Special Loan Collection.[251] Transporting this fragile instrument across the Channel was of course too hazardous to contemplate, but this makes it all the more remarkable that the electrostatic generator was put on display at the Paris Electrical Exhibition in 1881, as was described in detail at the beginning of the introductory chapter to this study.

5. Febris Rheumatica Articularis

Tragically, van der Willigen had died suddenly and unexpectedly early in 1878, at the age of 55. The cause of death given in Haarlem's municipal records is "febris rheumitica articularis", which probably means he suffered a heart attack as the result of rheumatic fever, i.e. an autoimmune disease.[252] Just how sudden his death was is illustrated by the fact that he had been elected president of the Society for Industry and Trade in Haarlem (*Maatschappij voor Nijverheid en Handel*) less than a year before.[253]

So van der Willigen did not live to see the electrostatic generator put on display in Paris, but one can see its presentation at the Electrical Exhibition and its celebration there as a "monument of science" as the continuation of van der Willigen's efforts to contribute to both of the international exhibitions held in 1876.[254] The fact that he was evidently supportive of the Special Loan Collection in particular suggests he would not have objected to the Cuthbertson machine being transported to Paris.

By the time of the Electrical Exhibition, the changes affecting science and the overall role of collections and museums that were so clearly reflected in van der Willigen's entire professional biography, became physically manifest at Teylers Museum. More specifically, the new annex mentioned at the beginning of this chapter was being built. Van der Willigen actually still witnessed the early construction work. In one of his last letters, written to the anthropologist Pieter Johannes Veth in November 1877, van der Willigen reported: "The Trustees have [...] building plans in mind; next to me lie the remains of three demolished houses, where next year a new building is to arise;"[255]

It took far more than a year for this new building to be completed. But when it finally was opened to the public in 1885, its impact on the way the museum's collections were handled and perceived was profound. Ultimately, they were a major factor in transforming Teylers

[251] Ibid., 1064.
[252] "Gemeente Haarlem Doodsoorzaken 1878", Haarlem, NHA.
[253] Bakhuyzen, "Nekrolog: Volkert Simon Maarten van der Willigen," 100.
[254] "Monument of science" was the term used in the official catalogue to the Paris Exhibition. See the introduction to this study for more detail.
[255] "De H.H. Directeuren hebben [...] bouwplannen in het hoofd; naast mij liggen drie panden afgebroken, waarop in het volgende jaar een nieuw gebouw moet verrijzen;" V.S.M. van der Willigen to P.J. Veth, 05.11.1877, Leiden, Epistolarium Veth, UBL BC, BPL 1756.

Museum into a museum of the history of science. That, however, is the topic of the next chapter.