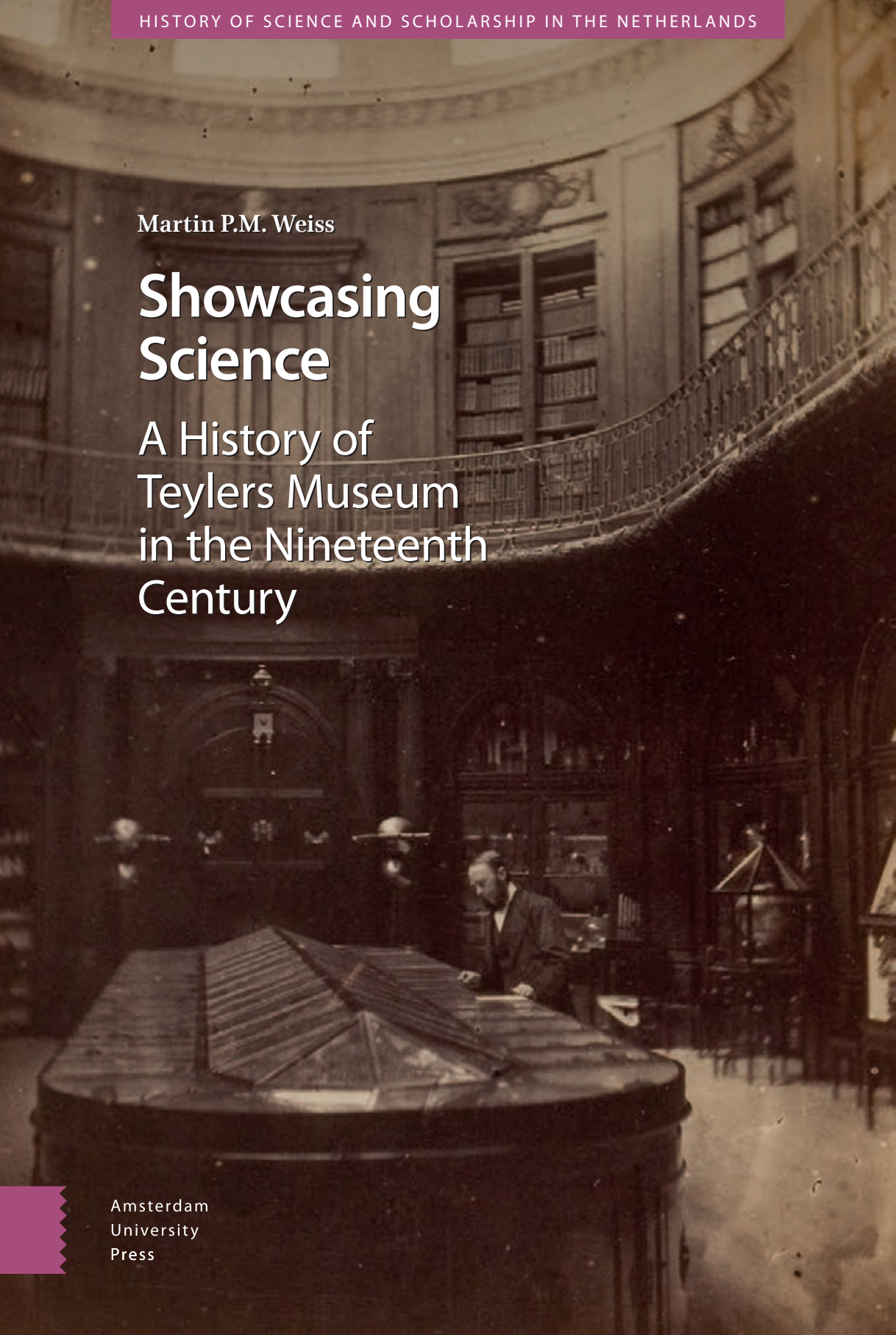
HISTORY OF SCIENCE AND SCHOLARSHIP IN THE NETHERLANDS



Martin P.M. Weiss

Showcasing Science

A History of Teylers Museum in the Nineteenth Century

Amsterdam University Press

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History of Science and Scholarship in the Netherlands

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A History of Teylers Museum in the Nineteenth Century

Martin P.M. Weiss

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I Teylers at the Paris Electrical Exhibition

Gerard Oyens was not keen on being upstaged by the British. But in March of 1881, he was worried he might be – and justifiably so. Oyens had just been tasked with organising the Netherlands' contribution to the Paris Electrical Exhibition of 1881 and, from his perspective at least, things had not got off to a good start.

The idea behind the Electrical Exhibition was that every country in the world could present the newest electrical devices its engineers and scientists had developed. The grand total of these separate, national sections to the Exhibition would then amount to a spectacular celebration and public demonstration of the immense progress that had been made in the field of electrical science in the space of just a few decades. As one official announcement published in France stated: "This exhibition will comprise everything to do with electricity: it will bring together apparatus of various types and various origins which serve to generate, transmit and use electricity".[1]

The Paris Exhibition was not the first large-scale international exhibition. Ever since the Great Exhibition held in London in 1851, a veritable hype had developed around what came to be known as the World's Fairs, with every country that could afford to do so organising various international exhibitions on a wide variety of topics. The exhibition in Paris was, however, the first that was devoted exclusively to electricity. What prompted it were the groundbreaking developments that had occurred over the course of a fairly short period preceding the exhibition. Not many years had passed since James Clerk Maxwell published his theory of electromagnetism for instance, and even more recently patents had been filed for the electric telephone and the electric light bulb, by Alexander Graham Bell and Thomas Alva Edison respectively. The world was quick to realise the far-reaching implications these and other inventions had, and the Paris Exhibition can be seen as the epitome of the excitement they generated, both amongst

1 "Cette exposition comprendra tout ce qui concerne l'electricité : elle réunira les appareils de toute nature et de toute provenance servant à la faire naître, à la propager et à l'utiliser". A. Cochery: "Congrès International des Électriciens, Exposition internationale d'électricité, Paris 1881, Rapport au Président de la République", c. January 1881, The Hague, NL-HaNA, WHN / Handel en Nijverheid I, 2.16.60.04, inv.-no. 287. The author takes responsibility for the translation of all quotes given in the original language in the endnotes.

the general public and amongst scientists and engineers. The exhibition itself was held from August until November 1881 at the *Palais de l'Industrie* on the Champs-Élysées, and it was accompanied by a four-day conference to which specialists from all over the world were invited. One "hot topic" at this conference was the establishment of standard units to describe electromagnetic phenomena.

But just like at all the other international exhibitions of that time, there was a strong competitive element to the Electrical Exhibition too. More specifically, it was competitive in two ways. Firstly, the idea was not only to showcase the progress that had been achieved in science and engineering in general, but also to develop the market for electrical apparatus. To the organisers of the exhibition, even the participants of the international conference were primarily potential clients for the exhibitors of electrical apparatus. A representative of the French government at least explained as much to the Dutch minister of trade and commerce when he wrote that for "the exhibitors", "the modest expenses of installing [their exhibits] will be a good investment", because "[t]hey will profit from a unique event, that has been anticipated for a long time and that was difficult to organise, at which they can display their inventions, explain their systems and let their machines function before the greatest scientists of the world".[2]

Secondly, on another level and again in much the same way as with all previous international exhibitions, the race was on to establish which country was the most productive and progressive, i.e. which country's display included the most spectacular innovation. This contest was less of an open one than that between different manufacturing companies. Manufacturers could measure and compare their level of success by citing the prizes that were awarded to them by an independent and international jury during international exhibitions. The jurors in turn had concrete criteria through which they could evaluate manufacturers' products, such as their durability, practical use, aesthetic quality, etc. A sense of national pride, by contrast, was far less tangible – but its importance should nevertheless be anything but underestimated during this particular period in history. The "nation state" had recently become a hugely important political category, and almost literally so. One could even say that the stability of the political system

2 "les exposants" ; "Les dépenses modiques d'installation [...] seront pour eux de l'argent bien place"; "Ils profiteront, en effet, d'une occasion unique, qui était depuis longtemps désirée et qui ne pouvait être que difficilement offerte, de produire leurs inventions, d'expliquer leurs systèmes et de faire fonctionner leurs appareils devant la réunion des plus grands savants du monde". G. Berger to G.J.G. Klerck, 8 December 1880, The Hague, NL-HaNA, WHN / Handel en Nijverheid I, 2.16.60.04, inv.-no. 287.

in Europe at the time depended in no small part on citizens developing a sense of pride that they belonged to a particular nation state: in defining themselves as members of such a nation state and pledging allegiance to it, even if only subconsciously, they were turning themselves into good and reliable citizens.

This contest of the nation states at international exhibitions brings us back to Oyens. Although he was probably not very worried about the stability of the European or even the Dutch political system in general, it was clear to him that in taking on the task of organising the Dutch section of the Paris Exhibition he had also accepted the higher responsibility of providing a positive image of the Netherlands at this exhibition, certainly in comparison with the other nations' displays. It was of course clear that the Netherlands, as a comparatively small country, would not be able to take on many of the larger nations. But Oyens was confident that the Dutch need not shy away from the competition. As he self-assuredly declared in a letter to the Dutch minister of trade and commerce which he sent shortly after his appointment, Oyens felt that "the Netherlands can certainly successfully compete with other countries, in particular concerning the excellent organisation of the telegraph service".[3]

In spite of his confidence, however, Oyens – who lived in Paris and ran a business there – soon found it difficult to rally the troops at home in support of his cause. The Dutch government in particular followed its traditionally liberal approach of leaving all cultural and economic matters – which obviously included international exhibitions – to private initiative, and was therefore reluctant to provide Oyens with any funding for his display, or any government items to include in it. Matters began to look even worse when he heard that the British Postmaster General had announced his office would send in "every kind of electrical and in particular telegraphic instruments which have been used by the British government since 1837 until now, and which demonstrate the important improvements that have gradually taken place in this area".[4] By drawing attention to their long history of important contributions to the development of telegraph systems, the

3 "Nederland zeker met andere landen gunstig kan wedijveren, vooral wat de voortreffelijke inrigting van het telegraafwezen aangaat"; G. Oyens to G.J.G. Klerck, 4 March 1881, The Hague, NL-HaNA, WHN / Handel en Nijverheid I, 2.16.60.04, inv.-no. 287.

4 "elke soort van electrische en in 't bijzonder telegrafische instrumenten welke sedert 1837 tot heden door de Engelsche regeering zijn gebruikt worden, en welke dus de belangrijke verbeteringen aantoonen welke successievelijk op dat gebied hebben plaats gehad"; G. Oyens to G.J.G. Klerck, 17 March 1881, The Hague, NL-HaNA, WHN / Handel en Nijverheid I, 2.16.60.04, inv.-no. 287.

British were of course bolstering their claim to pre-eminence in this area of technology – which was precisely the area in which Oyens had hoped the Dutch would be able to prove their mettle.

Somewhat desperate, Oyens again wrote to the Dutch Ministry of Trade and Commerce. Attempting to invoke a sense of debt towards the French government as the hosts of this international exhibition, he first reported how he had heard about the British plans, and then "how pleased His Excellency the Ministre des Postes & Telegraphes, under whose patronage the Exhibition will be held, would be if the Dutch Government would also contribute such an important collection".[5]

Ultimately, however, his pleas were to no avail. The Ministry of Trade and Commerce did actually take them seriously enough to pass the matter on to the state telegraph company (*Rijkstelegraaf*). But its chief director did not consider it wise to try and match this British show of past ingenuity. He scribbled his reply on the letter he had been sent by the Ministry, stating: "The state telegraph company acquires its instruments from abroad and is therefore unable to contribute anything original or special. In such a situation it is better, I think, to refrain entirely from participating".[6] And this way, no extra costs were of course incurred either.

But Oyens did not give up easily. In fact, he had a backup plan. It appears he had actually harboured some grave doubts as to whether his government was going to support him, because the very same day he penned his letter to the Ministry of Trade and Commerce, he also sent one to the Dutch Manufacturers Society in Haarlem (*Nederlandsche Maatschappij voor Nijverheid en Handel*), asking for help. He had already been in contact with this society about the Exhibition over the course of the previous weeks; although Oyens was officially appointed by the Dutch government, because he was based in Paris the Manufacturers Society had taken on organisational matters such as announcing the Exhibition and encouraging its members to participate. After all, manufacturers of electrical apparatus stood to gain the most from this Exhibition, at least in the short term. What Oyens was hoping to obtain from the Society now was some information: he had heard that there was a museum in Haarlem with an "important" collection of electrical apparatus.

5 "hoe aangenaam het Z.E. den Ministre des Postes & Telegraphes, onder wiens bescherming de Tentoonstelling zal plaats hebben, zou zijn indien de Nederlandsche Regeering ook eene dergelijke belangrijke verzameling zou willen inzenden". Ibid.

6 "De Rijkstelegraaf ontvangt zijn toestellen van buiten 's lands en zou dus niets oorspronkelijks of eigenaardigs kunnen inzenden. In zoodanig geval doet men, meen ik, beter zulks geheel te onthouden". Hoofddirecteur der Telegrafie to Ministry of Waterstaat, Handel en Nijverheid, 25 March 1881, The Hague, NL-HaNA, WHN / Handel en Nijverheid I, 2.16.60.04, inv.-no. 287.

> [I] politely request [...] you to inform me whether it would be possible, for this first electrical exhibition, to procure some of the important electr. instruments which are housed in the museum in your home town

he wrote to the president of the Manufacturers Society.[7]

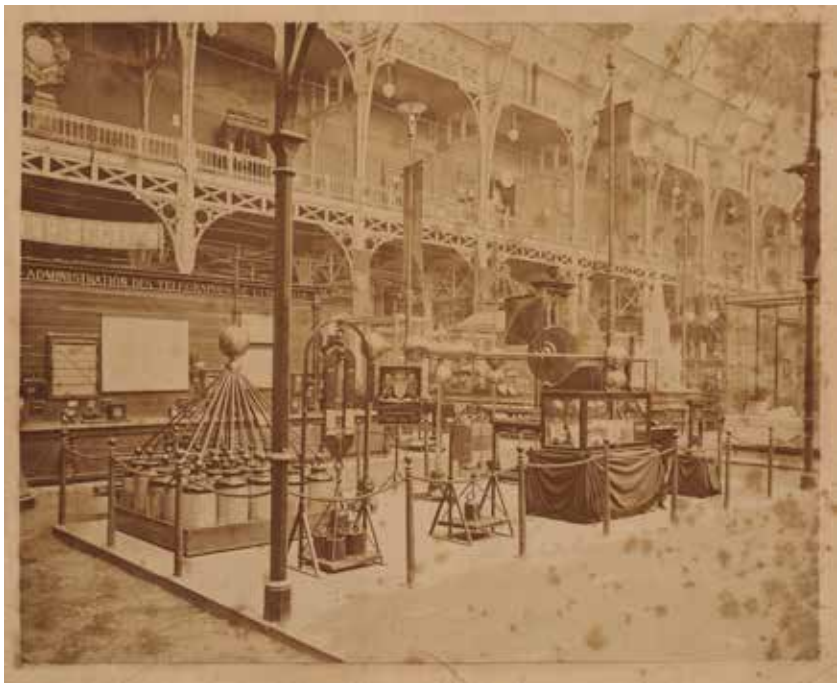
It seems a little strange that Oyens did not refer to the museum by its name: Teylers Museum. In fact the entire wording of his letter suggests that he was not familiar with it. Somewhat surprisingly, his attention appears to have been drawn to the museum by the French government representative who had been tasked with coordinating the Exhibition. Oyens reported how, on a visit to Haarlem, this Frenchman had been "struck by the large number of important items in the museum".[8] Indeed, if Oyens had really never heard of Teylers Museum before, he is sure to have been similarly impressed very soon. And he is sure not to have forgotten this privately owned museum for the entire remainder of his life, because the way subsequent events then unfolded, Oyens eventually built the entire Dutch display around the largest and simultaneously most magnificent item that he was provided with by Teylers Museum: the Cuthbertson electrostatic generator from 1784.

This was not just any electrostatic generator. At the time of its completion it had been the largest of its kind in the entire world, and, in part because electrostatic generators were soon rendered obsolete by the development of the Voltaic pile, the machine in Haarlem never had to cede its title either. Already in its heyday it had inevitably attracted a lot of attention. This, in turn, was greatly encouraged by the machine's initiator and first director of Teylers Museum, Martinus van Marum. He saw to it that word was spread of this huge device that had the potential to push the boundaries of science, and once he had completed and published the results of a series of experiments he conducted with the generator, he ensured copies of the publication were circulated widely. At one point for instance he succeeded in personally presenting Benjamin Franklin with a copy. Through his efforts Van Marum effectively built both his own and Teylers Museum's reputation around the electrostatic generator, thereby literally putting "his" new museum in Haarlem on the map.

7 "[Ik] verzoek [...] U beleefdelijk mij te willen mededeelen, of het mogelijk zou zijn voor deze eerste electrische tentoonstelling een gedeelte der belangrijke collectie electr. Instrumenten welke zich in het museum à costy bevinden te bekomen"; G. Oyens to F.W. van Eeden, 17 March 1881, Haarlem, NHA, Nederlandsche Maatschappij voor Nijverheid en Handel te Den Haag, vol. 609, no. 765.

8 "getroffen door het vele belangrijke hetwelk dit museum bezit"; Ibid.

Figure 1 The electrostatic generator on display at the Paris Electrical Exhibition in 1881



Teylers Museum, Haarlem

Now, almost a century later, the electrostatic generator had evidently not been forgotten, and still did not fail to impress. The British might have had their collection of historic telegraph equipment, but it was the electrostatic generator in the Dutch section that made it into the introduction to the catalogue of the Electrical Exhibition. As part of a brief, introductory bird's-eye guided tour through the *Palais de l'Industrie*, the visitor was informed how, next to the German section, one could find "the exhibition of the Netherlands, in the midst of which has been placed the enormous electric machine of Van Marum, almost a monument, and in any case a historical curiosity".[9] A description of the machine then followed, and it was pointed out how "during its age, the electric machine of Van Marum was a marvel".[10]

9 "l'exposition des Pays-Bas, au milieu de laquelle on avait placé l'immense machine électrique de Van Marum, presque un monument, et en tout cas une curiosité historique"; Parville, 1882, p. 7.

10 "pour l'époque, la machine électrique de Van Marum était une merveille". Ibid., 7-8.

Oyens, clearly, had lived up to expectations and fulfilled his mission – thanks in no small part to the support he received from Teylers Museum.

Very little detail is known about the actual process by which the electrostatic generator arrived in Paris, alongside a number of other, smaller instruments from the collection of Teylers Museum. Hardly any correspondence has been preserved that could throw some light on questions such as why those in charge of the Museum agreed to participate in the Electrical Exhibition, by exactly how much it set them back financially, or how the huge logistical feat of transporting the fragile electrostatic generator the distance of more than 500 kilometres from Haarlem to Paris – and then bringing it back in one piece – was achieved. Nevertheless, the fact remains that they did, and that by doing so they played a pivotal role in creating a display at the Electrical Exhibition that helped bolster the Netherlands' image abroad as a serious contender in matters of science and technology.

This entire episode, in turn, provides an indication of how deeply engrained Teylers Museum already was in the topography of Dutch culture by the end of the nineteenth century, and, even more importantly, touches upon the issues that lie at the heart of the book you have just started reading. More specifically, there are two issues, and the episode just described represents them in the following way: Firstly, by end of the nineteenth century Teylers already had a history, longer than most other institutions that carry the title "museum". This is a book about that history, told from the vantage point of the Museum's scientific instrument collection.

Secondly, what is also reflected in this episode is how scientific instruments were increasingly appreciated for their historical value. The electrostatic generator is a case in point: originally built solely for the purpose of research, by the time of the Electrical Exhibition its primary value lay in its historical significance. In other words, instruments were being recognised as cultural artefacts, which was actually a new phenomenon. And where better, one might suppose, to preserve and display cultural artefacts than in a museum? However, the single biggest mistake one could make in assessing the history of Teylers Museum – or, for that matter, any other nineteenth century museum – is not to take into account the huge shift in meaning the word "museum" underwent over the course of that century. It was only by the end of the nineteenth century that museums had acquired a reputation primarily as places for the public display of collections – and even then, they were associated above all with the fine arts, not with science and technology. By and large, "science museums" are actually a twentieth century phenomenon.

This makes Teylers Museum a particularly worthwhile case study, and not only because it was called a museum and housed a prominent collection of scientific instruments at a time when this was far from ordinary, but also for another reason, which hasn't even been mentioned yet, but is of crucial importance: from the very beginning, Teylers Museum was also home to a collection of fine art that was of equal value – if not higher – to its scientific collections. In other words, Teylers Museum was an art museum as well, and as such it was subjected to the changing concept of what role "museums" were to fulfil to a far greater extent and in a different way than if it had only housed scientific collections. Consequently, a major theme of this book is provided by the twists and turns that resulted from this double – or hybrid – identity of Teylers Museum.

So, in a nutshell, the aim of this book is: firstly, to give an account of the history of Teylers Museum in the nineteenth century and to do so from the vantage point of the Museum's instrument collection, and secondly, to illustrate how Teylers Museum was subject to and therefore reflects the changing ideas on what constituted the role and function of "museums" over the course of the nineteenth century.

II Teylers Museum

Teylers Museum's roots lie in the last will and testament of a wealthy Haarlem textile merchant and banker, Pieter Teyler van der Hulst, who died a childless widower in 1778. He had stipulated that his fortune was to be used to set up a foundation in his name – the Teyler Foundation – which in turn was to ensure that his bequest would serve to support the study of theology, the study of the arts and sciences, and charitable causes. To further the first two of these causes, two learned societies were to be set up. Shortly after Teyler's death, and even though he had not mentioned anything of the kind in his will, the decision was taken to set up a museum. A purpose-built two-storey high edifice, which came to be known as the "Oval Room", was subsequently erected behind Pieter Teyler's old town house in Haarlem. Upon its completion in 1784, the aforementioned Martinus van Marum was appointed the new institution's director and supplied with one of the first – and for many years also one of the most spectacular – items that were bought for the Museum's collection, i.e. the Cuthbertson electrostatic generator.

Three points which proved to be particularly important for the Museum's future development in a variety of manners are already discernible at this

stage of its history: first of all, it is already explicitly referred to as "Teylers Museum", albeit that other terms were used on occasion as well. The name "Teylers Museum" stuck, however, and by the end of the twentieth century it was therefore frequently being referred to as "the oldest museum of the Netherlands". Secondly, the Museum housed both scientific collections and a collection of fine art. One of the main reasons was that Teyler had stipulated that both the "arts" and the "sciences" were to be supported through his bequest. These terms' connotations changed profoundly over the course of the nineteenth century, but both areas of collecting were developed in equal measure at Teylers Museum as the century progressed. Put shortly, Teylers Museum was therefore never "just" an art museum or a museum with scientific collections. Thirdly, Teylers Museum was privately owned. To be precise, all its costs were covered by the Teyler Foundation. As the nineteenth century progressed and state funding became increasingly important in all matters pertaining to culture, Teylers Museum's private ownership became increasingly exceptional. The Foundation actually retained full responsibility for the Museum almost until the close of the twentieth century. By 1982, however, the changes in the financial markets of the previous decades had left the Foundation in a precarious situation, almost unable to pay for the upkeep of its Museum. At this point the Dutch government stepped in, Teylers Museum was declared a monument of national importance, and an agreement was reached by which Teylers Museum effectively became a national, publicly funded museum, albeit that the Foundation retained some influence on the way it was run.

Largely as a result of these changes in financial policy, by 1982 Teylers Museum had gone through a long period during which little had been changed on both its collection and its housing. This meant that essentially all of the original museum buildings – the Oval Room and all further annexes that were added over the course of the nineteenth century, the last of which was completed in 1892 – had been preserved in their original state – or at the very least in their late-nineteenth century or early-twentieth century state. Guidebooks that had been written before the turn of the century were still largely appropriate.[11] So, by this time, in contrast to many other museums Teylers Museum was not only of interest because of the collections it housed, but it had also acquired an additional role as a "museum of museums", reflecting earlier architectural conventions and presentation techniques, and providing a tangible juxtaposition of how they had changed

11 Such as, for instance, the guidebooks compiled by Tiberius Cornelis Winkler. See Vos & Veen, 1992, pp. 5-7.

over the nineteenth century. As has been pointed out by many before: "To enter Teyler's, especially the Oval Room, is to enter a 'time-machine'".[12] This, and the world-class quality of both its scientific collections and its art collection, began to generate much scholarly interest, starting roughly during the period in which it became a state museum.[13]

This new account of Teylers Museum's history was able to draw on all of these previous studies regarding various aspects on the institution's history. Far more than just a synthesis of these previous works, however, it differs from them in four specific ways. Firstly, it asks more fundamental questions, situating developments at Teylers within the larger context of the history of museums. Secondly, it covers a far greater period in history than any of the previous studies, namely what could be described as the "long nineteenth century", from about 1780 until about 1930. Thirdly, it focuses specifically on the Museum, addressing aspects of the history of the other local institutions associated with the Teyler Foundation and the Teyler Foundation itself only in so far as this is relevant to gain a better understanding of the Museum's history. This account does not, for instance, provide a history of the library of the Teyler Foundation, although this was always closely connected to Teylers Museum. Finally, the history of Teylers Museum is told from the vantage point of its scientific instrument collection. More specifically, it focuses on three curators who were in charge of this collection at different times during the nineteenth century. The first of these is Martinus van Marum, the second Volkert Simon Maarten van der Willigen, and the third Hendrik Antoon Lorentz.

12 Turner, 1996, p. 11. Over the years, various English spellings have been used to refer to the Museum: "Teyler's Museum", "Teylers Museum", or "the Teyler Museum". Note how Turner refers to it as "Teyler's Museum" in the quote, whereas it is referred to as "the Teyler Museum" in the title of the book from which the quote is taken. In Dutch, the consensus has emerged that the Museum should be referred to as "Teylers Museum", and not "het Teylers Museum" or "Teyler Museum". Therefore, and because it has been done before, the Museum will be referred to by its Dutch name, i.e. "Teylers Museum", throughout this study.

13 The following publications are either devoted to the Museum's history or contain sections which are: Levere, 1973, pp. 39-102; Turner & Levere, 1973; "Teyler" 1778-1978, 1978; Turner, 1985, pp. 227-240; Mijnhardt, 1988; Bouman & Broers, 1988; Turner, 1996; Plomp, 1997; Tuyll van Serooskerken, 2000; Schwartz, 2004; Schmidt, 2006; Scharloo, 2009; Janse, 2011. In addition to this literature, a number of studies concerning individuals associated with Teylers Museum is available: Lefebvre, de Bruijn, & Forbes, 1976; Breure & de Bruijn, 1979; Dijkstra, 1974, pp. 138-159; Hoorn, 1993, pp. 278-290; Hoorn, 1998, pp. 14-21; Stegeman, 2004; Sliggers, 2006a; Janssen, 2007; Jong, 2011; Sliggers, 2017. Finally, ever since its first edition was published in 1983, *Teylers Magazijn* has regularly included short articles on various aspects of the Museum and its collections' history.

Focusing on these three curators allows for a better illustration of certain fundamental changes that occurred over the course of the nineteenth century. More to the point, this choice allows one to highlight and contrast how these three individuals – all of them acknowledged members of their generation's scholarly elite – thought about the production and the consumption of knowledge, and how this in turn affected their work at Teylers Museum. Put differently, it allows for a juxtaposition of their concept of the value of knowledge: how should it be gained? How could knowledge claims be assessed? How were these to be communicated and to whom? Was there – or should there be – any practical use derived from the accumulation of knowledge, or was this an end in itself? Addressing these issues allows for a better understanding of how these curators defined their own – and by extension Teylers Museum's – public role.

III Museums and Popular Science

By addressing these questions and by providing an account of the history of Teylers Museum from the vantage point of its scientific instrument collection, this book aims to contribute to a better understanding of how the public role of science and the rules of scientific debate were affected by the emergence of museums as specific spheres of engagement within civil society.[14] By the beginning of the twentieth century, museums had acquired an educational function not only in the sense that their exhibitions conveyed knowledge about the collections on display, but also in the sense that a museum visit conveyed a sense of how every well-educated citizen should behave in public: tacit behavioural patterns which were to be followed upon entering a museum had emerged, and a certain type of architecture to encourage these behavioural patterns had been established.[15] The historian and sociologist Tony Bennett has described museums of the late nineteenth century as just one particular high-brow type of exhibition

14 Civil society is taken here in the sense that Thomas H. Broman uses it in his article: Broman, 2002, pp. 1-21. Broman defines civil society "in its broadest meaning as describing a realm of social life positioned between the family and the state" (p. 1).

15 Many studies over the past decades have established how the definition and public function of museums evolved over the course of the nineteenth century. For a comprehensive overview of publications until 2005 see: Starn, 2005; pp. 68-98. A more recent overview is provided by: Heesen, 2012. Some of the most frequently quoted publications on the public role of museums and exhibitions include: Hooper-Greenhill, 1992; Duncan, 1995; Bennett, 1995; Rees Leahy, 2012. On the public role of collections in the Low Countries see: Tibbe & Weiss, 2010; Nys, 2012.

offering an "exercise in civics" within a larger "exhibitionary complex" comprising all types of material display, e.g. at public fairs. As Bennett sees it, public museums helped establish the bourgeoisie.[16] Moreover, museums had acquired a reputation as non-commercial entities, which was largely possible because the most prominent, national museums were essentially state-funded. Finally, by the end of the nineteenth century, museums had largely come to be associated with the fine arts. Upon entering a museum building, visitors would have most likely expected to be able to indulge in the aesthetic contemplation of works of art.[17] At the same time, the genre of "popular science" emerged over the same period in history. Many historians of science have pointed out how an increasing distinction between expert "scientists" with vocational training on the one hand and a lay audience on the other hand emerged over the course of the nineteenth century and how this is reflected in the emergence of a distinct genre of "popular science" literature. This is not to say that public engagement with science diminished, but rather that the rules of debate and the role individuals could take on within these debates evolved.[18]

If one bears these developments in mind, studying the public role of the instrument collection at Teylers Museum over the course of the nineteenth century constitutes a particularly worthwhile case study: not only were the scientific instruments at Teylers constantly juxtaposed with a collection of fine art within the same complex of buildings, but over the course of the century scientific instruments increasingly acquired a role as one of the primary tools through which experts could distinguish themselves from a lay public. This is not to deny or even question their research value, but simply to draw attention to the fact that as scientific instruments became increasingly sensitive and complex measuring devices, they required ever more (vocational) training to operate.[19] It stands to reason that scientific instruments therefore also acquired a role as particularly noteworthy

16 Bennett, 1995, pp. 59-87, p. 102.

17 This development needs to be seen as part of a larger process of the purpose of "fine art" and aesthetics being redefined within academia. On this see for instance: Kristeller, 1951, pp. 496-527; Kristeller, 1952, pp. 17-46. On the development of art museums see: Kratz-Kessemeier, Meyer, & Savoy, 2010.

18 For an overview of debates see Topham, 2009. One of the most frequently cited works in all these recent debates is: Secord, 2004, pp. 654-672. For the popularisation of science in Great Britain in the nineteenth century see: Lightman, 2009; Fyfe & Lightman, 2007. Some of the specificities of the Dutch situation are addressed in: Roberts, 1999, pp. 680-714; Lunteren, 2011, pp. 85-104.

19 This is not to say that early modern scientific instruments lacked complexity. But at the very least, one can say that by the end of the nineteenth century more instruments required

symbols of scientific research and the increasing distinction between trained experts and amateurs.[20] Moreover, it was Teylers Museum's instrument collection – particularly the acquisition of the Cuthbertson electrostatic generator – which had the greatest impact on shaping the young institution's identity and public perception. In sum, choosing the Museum's instrument collection as a vantage point from which to analyse its entire history therefore allows for the best analysis of the question of how much of an impact Teylers Museum's eighteenth century, early-modern roots had on the institution's nineteenth century development, its role within society, and its perception by outsiders.

IV Structure and Intended Readership of the Book

First of all, the idea is that this book will provide anyone who has come across Teylers Museum and is interested in its history with a better understanding of just that – no matter from which angle they want to approach it or what amount of background knowledge they already have. In other words, this is a book aimed at experts in search of more detail and background information on Teylers Museum, as well as anyone merely in search of a good read. Although, inevitably and perhaps also because it was devised as a scholarly work, those already familiar with some of the literature and sources this study is based on – or even just the historical context in which the Museum developed – will probably find this book easier to read than others. Nevertheless, great care was taken to keep this account of Teylers Museum's history as self-explanatory as possible.

Secondly, this book hopes to be of particular value to all those who are interested in the changing status of scientific instrument collections over the course of the nineteenth century. It remains striking just how few cabinets of physics – which were almost ubiquitous in the eighteenth century – were preserved in their entirety until the beginning of the twentieth century, although instruments from these cabinets then frequently resurfaced in science museums and museums of the history of science. Perhaps the demise

onlookers who were not involved in operating the apparatus to be excluded than had been the case in early modern experimentation.

20 A similar case can perhaps be made for anatomical collections, although in Leiden they were increasingly removed from the public realm as the nineteenth century progressed, as Hieke Huistra as shown. On the history of anatomical preparations and the history of their presentation see: Alberti & Hallam, 2013; Knoeff & Zwijnenberg, 2015. On the history of the anatomical collections in Leiden in particular see: Huistra, 2013; Hendriksen, 2015.

of the cabinet of physics is the main reason why relatively little has been published on the overall status of nineteenth century instrument collections.[21] The amount of publications (although not their quality) certainly pales in comparison with the body of literature on the history of nineteenth century art collections, collections of antiquities, and even natural history collections that has become available over the course of the past decades. By providing a detailed analysis of one of the few instrument collections that did survive the nineteenth century intact and by identifying the reasons why this was the case, this study hopes to be of further use to those poring over other instrument collections.

Thirdly and finally, this study hopes to contribute to the growing body of literature on the history of Dutch collections and museums in the nineteenth century.[22] Any account of the history of Dutch museums should not exclude Teylers Museum. The most straightforward reason is that Teylers Museum was the first building in the Netherlands that was not only purpose-built to house a collection, but also referred to as a "museum" from the very beginning. What's more, it always enjoyed a certain prominence, already because of the Teyler Foundation's financial muscle. But it is also of great interest and can, in particular, complement the existing literature on Dutch institutional collections because Teylers Museum was privately owned throughout the period of history that is covered by this study. The lion's share of literature on institutional collections – and this does not just ring true for the Netherlands but also for international publications – concerns institutions in which the state or some form of officially sanctioned and publicly funded body was intricately involved. To some extent the ratio of literature on government-supported collections to literature on privately owned collections reflects the actual ratio of these collections. Indeed, as the nineteenth century progressed, Teylers Museum's status as a privately

21 For publications that address not only the history of particular instrument collections or particular science museums and their precursors, but also the question of the overall status of scientific instrument collections in the nineteenth century, see for example: Klemm, 1973; Clercq, 1985; Turner, 1995; Turner, 2000, pp. 23-47; Bennett, 2006, pp. 73-78; Anderson, 2006, pp. 79-87. Ackermann, Kremer, & Miniati, 2014; Bergers & van Trijp, 2017, pp. 366-370.

22 The list of available literature on the history of Dutch museums is already extensive if one only focuses on scholarly monographs on institutional collections in the Netherlands, i.e. if one excludes scholarly articles published in journals, publications on collections acquired by individuals, monographs published by museums themselves, and publications on Belgian collections and museums: Bierens de Haan, 1941; Scheurleer et al., 1967; Duparc, 1975; Bergvelt, 1998; Sliggers & Besselink, 2002; Halbertsma, 2003; Bergvelt & Tibbe 2003; Noordegraaf, 2004; Bergvelt, Meijers, & Rijnders, 2005; Mehos, 2006; Effert, 2008; Tibbe & Weiss, 2010; Bergvelt et al., 2009; Bergvelt et al., 2011; Hoijtink, 2012; Huistra, 2013.

owned museum became increasingly exceptional. But that idiosyncratic status just makes it all the more interesting, and a better understanding of the way those in charge of the Museum defined its public role and the reasons why it continued to thrive in the face of its idiosyncratic status, can contribute to an increasingly nuanced picture of the overall status of collections in the nineteenth century, particularly in the Netherlands.

This book consists of the introductory section you are currently reading (which is also Chapter 1) and four additional, main chapters. These five chapters are followed by a concluding sixth chapter. Chapter 2 focuses on the period between Pieter Teyler's death in 1778 and the completion of the Oval Room in 1784. A tableau is drawn of the context within which the idea for Teylers Museum was born and within which it was constructed. Special attention is paid to the role Martinus van Marum played in these developments. The following three chapters each revolve around a curator of the scientific instrument collection. The focus of Chapter 3 lies with Van Marum's views on the production and consumption of knowledge and in how far these are reflected in his work at Teylers Museum between 1784 and 1837. Chapter 4 revolves around Volkert Simon Maarten van der Willigen. It contains an analysis of Van der Willigen's ideas concerning the public role he and – by extension – the collections under his purview were to fulfil. The question in how far these ideas were compatible with the general changes institutional collections were undergoing around the middle of the nineteenth century is asked. Chapter 5 revolves around Hendrik Antoon Lorentz. After an account of developments at Teylers Museum in the three decades following Van der Willigen's death in 1878 and preceding Lorentz' arrival in 1909, the reasons why Lorentz took on the job of curator are scrutinised, as is his work in Haarlem until he passed away in 1928. The book ends with a summary of the general conclusions that can be drawn from this study.