Chapter III: Van Marum – Empiricism and Empire

I Van Marum's Work at Teylers Museum

1. You Win Some, you Lose Some

After having spent more than one and a half years helping John Cuthbertson construct the largest electrostatic generator ever to be built and helping him negotiate all the unexpected challenges this brought about – the huge, 65 inch glass discs that are rotated to generate friction were in themselves an extraordinary feat of glass casting – finally seeing the machine installed at Teylers Museum and being able to crank it up for the first time must have made van Marum feel like a child unwrapping an eagerly anticipated birthday present.[1] After much delay this stage was finally reached in December of 1784, just one month after van Marum had been appointed director of Teylers Museum. Conscious of whom he had to thank for this amazing machine, van Marum wasted no time in demonstrating it to the trustees of the Teyler Foundation.[2]

But as enamoured as van Marum was with this powerful device now at his disposal, his fellow employee of the Teyler Foundation, Vincent van der Vinne, was not. As was already mentioned in the previous chapter, it did not take him long to complain about van Marum's constant experimenting to the trustees. They, however, took van Marum's side in this dispute and explicitly stated that "because of the extensive aims that the Trustees have in mind for the public good, there will necessarily be some nuisance for the Occupant [of the Foundation House]". Because van Marum wanted to perform experiments with the electrostatic generator, he would have to "be present repeatedly in the Musaeum for that purpose both in the evening and in the daytime".[3]

[1] Van Marum kept notes of the process of its construction: Martinus van Marum: "Journaal van mijne Verrichtingen ter verkrijging eener Verzameling van Physische Instrumenten & Modellen van nuttige Werktuigen in Teylers Museum", 1783-1790, Haarlem, NHA, Archief van Marum, vol. 529, nr. 11d, fol. 1-23. On the machine and its construction see also: Willem D. Hackmann, *John and Jonathan Cuthbertson: The Invention and Development of the Eighteenth Century Plate Electrical Machine* (Leyden: Rijksmuseum voor de Geschiedenis der Natuurwetenschappen, 1973), 29–31.
[2] "Notulen Tweede Genootschap", 04.02.1785, Haarlem, ATS, vol. 1382.
[3] "uit hoofde der uitgebreider oogmerken welke Directeuren zig ten nutte van het algemeen voorstellen, noodwendig eenige meerdere last voor den Bewooner [van het Fundatiehuis] volge"; "ten dien einde meermaalen zo bij avond als bij dag zig in het Musaeum [...] bevinden"; "Directienotulen", 24.12.1784, Haarlem, ATS, vol. 5.

Van der Vinne was granted some respite when damp weather prevented van Marum from continuing with his experiments throughout the winter, but the apparent serenity did not last long. As soon as "an unexpected Frost" befell Haarlem in early February, van Marum took this opportunity to demonstrate the electrostatic generator to his fellow members of Teylers Second Society.[4] They were suitably impressed, recording that the "experiments [...] have completely answered or even surpassed the expectations that had been formed of this exceptionally large and excellent piece of artisanship".[5]

Van der Vinne, on the other hand, will hardly have appreciated that this demonstration was given in the evening. Just three months later, in fact, he informed the trustees that he was resigning from his post as caretaker of the Foundation's art collection and his wife and he were moving out of the Foundation House, citing "the inconveniences of living in this House and in particular those that they have suffered recently from Mr van Marum"[6] After the trustees' attempts at persuading van der Vinne to stay on failed, they accepted his resignation and by the end of June had chosen Wybrand Hendriks as his successor. Hendriks was to stay on until 1819.

2. The Bigger the Better

On the very same day that van der Vinne handed in his resignation, van Marum informed the Second Society that he wanted to publish the results of the series of experiments he had been performing with the electrostatic generator in the Society's Proceedings (*Verhandelingen uitgegeven door Teyler's Tweede Genootschap*) – the fact that he had enough material to fill an entire booklet in itself already seems to underscore that he had indeed spent every possible moment working with the new machine, and that van der Vinne's complaints were perhaps not entirely unfounded. Never one to do things by halves, van Marum had even prepared a preliminary version of an introduction to the treatise on his experiments already, and informed his fellow members that the trustee van Zeebergh himself had suggested publishing the results of his experiments as a third volume of the Society's Proceedings (the first two volumes had contained treatises by the winners of the Society's prize essay competitions) – clearly, the trustees' backing had already been secured.[7]

[4] "Notulen Tweede Genootschap", 18.02.1785, Haarlem, ATS, vol. 1382.
[5] "een onverwachte Vorst"; "proef-neemingen [...] allezins hebben beandwoord aan, of zelfs overtroffen de verwachtingen, die men van dit ongemeen groot en voortreflijk konst-stuk had opgevat"; Ibid.
[6] "de lastigheeden der bewoninge van deezen Huize en bizonder die welke zij zints eenigen tijd door de Hr. van Marum lijden"; "Directienotulen", 06.05.1785, Haarlem, ATS, vol. 5.
[7] "Notulen Tweede Genootschap", 06.05.1785, Haarlem, ATS, vol. 1382.

Roughly a month later, the treatise had been printed, revealing van Marum's ardent labour of the past months. The details of his research have been summarised and discussed elsewhere, so a short overview should suffice for all purposes here.[8]

It is particularly interesting to note that his experiments did "not together form any unified research project".[9] It seems rather that van Marum applied the unprecedented high voltages the machine could generate to a variety of experimental set-ups that were being controversially discussed at the time. He indicates as much in the preface to the treatise, when he recapitulates:

"[T]he history of Electrical Science teaches us that progress in this science has been made in step with the use of ever larger electrical instruments giving a more powerful electrical force. Reflecting on this, there seemed to me to be every ground for hoping that a still more powerful electrical force than used so far, if such could be produced, would lead to new discoveries."[10]

In other words: "the bigger the better", and van Marum was hoping to be able to resolve some controversies about the nature of electricity with Cuthbertson's generator.

It is equally important to note that van Marum was not performing these experiments on his own. This would in fact have been impossible for the simple reason that at least two people were needed to crank up the machine. But van Marum did not only employ mere assistants to perform menial tasks, he was joined by other eminent scholars in performing experiments in the Oval Room. More specifically, he was regularly joined by John Cuthbertson, Adriaan Paets van Troostwijk, Jan Rudolph Deiman and Jan Hendrik van Swinden. For a brief while John Cuthbertson was even paid the handsome sum of f200,- a month to take care of the instrument and its accessories, which put him roughly on par with van Marum in terms of salary.[11] Adriaan Paets van Troostwijk and Jan Rudolph Deiman built a reputation as some of the finest chemists of the Netherlands. Together with van Marum they used the electrostatic generator to find out more about the combustion of gases, the oxidation of metals – which was then referred to as calcination – and the conductivity of various metals and other substances. Van Swinden and van Marum focused on the former's longstanding interest in magnetism, testing the effect the charges generated by the electrostatic generator had on permanent and artificial magnets. At one point they saw themselves confronted with – and were puzzled by – electromagnetic effects, but did not pursue these any further, as Oersted famously did some 40 years later.

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[8] Willem D. Hackmann, "Electrical Researches," vol. 3, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1971), 329–378; H.A.M. Snelders, "Martinus van Marum En de Natuurwetenschappen," in *Een Elektriserend Geleerde: Martinus van Marum 1750-1837*, ed. Lodewijk. C. Palm and Anton Wiechmann (Haarlem: J. Enschedé, 1987), 158–168.

[9] Hackmann, "Electrical Researches," 330–331.

[10] Martinus van Marum, "Description of a Very Large Electrical Machine Installed in Teyler's Museum at Haarlem and of the Experiments Performed with It," ed. E. Lefebvre, J.G. de Bruijn, and R.J. Forbes, vol. 5, Martinus van Marum: Life & Work (Leyden: Noordhoff International Publishing, 1974), 4.

[11] Gerhard Wiesenfeldt, "Politische Ikonographie von Wissenschaft: Die Abbildung von Teylers 'ungemein großer' Elektrisiermaschine, 1785/87," *NTM* 10 (2002): 226.

On occasion the members of Teylers Second Society were involved in the experiments as well. The minutes of a Society's meeting in early March 1785 contain a graphic description of what they witnessed: Van Marum had crisscrossed the Oval Room with a long, thin wire, through which – in contemporary wording – "electric fire-stuff" (*electric vuur-stof* or phlogiston) was then channelled. The wire immediately started glowing, which in itself must have looked impressive. Although the description is slightly ambivalent and it is not entirely clear what the experiment entailed, what clearly transpires is how spectacular it must have been. The members described how they had the impression that the wire was "surrounded by long fiery fluff", and that it "as soon as touched with a finger, emitted sparks of fire."[12]

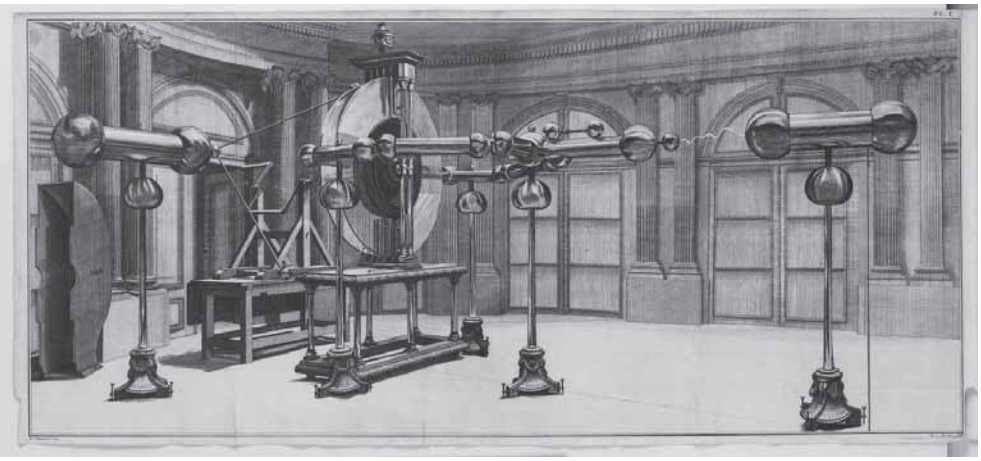

Fig.5. The electrostatic generator as depicted in van Marum's "Description"of 1787 (Teylers Museum, Haarlem)

At one point even van Marum's wife was drafted in to help with an experiment. Van Marum was trying to establish whether an electric charge had any effect on a human's pulse rate, and tried this on all of the above named associates. Finally, he also measured Joanna's pulse rate, as well as that of a young girl, after they had been subjected to a slight electric charge. No connection could be established.

3. A World Wide Web

The way in which the first experiments conducted with Cuthbertson's electrostatic generator were essentially a joint effort – if one that was orchestrated and coordinated by van Marum – is reflected in his frequent use of the pronoun "we" instead of "I" in the 1785 treatise. The team spirit he displayed at this stage of his career in turn reflects his networking skills, which

[12] "met lang pluis van vuur omgeeven"; "bij d'eerste aanraaking met den vinger vonken vuurs van zich gaf; "Notulen Tweede Genootschap", 04.03.1785, Haarlem, ATS, vol. 1382.

he was about to unleash on the scholarly community beyond the borders of the Dutch Republic. His directorship of the Holland Society's natural history cabinet had already provided him with the means to become acquainted with foreign scholars – Alessandro Volta for instance had visited the cabinet in 1782, and many years of fruitful correspondence between the Italian and van Marum ensued. But the electrostatic generator of course provided an even better way to attract the attention of other researchers, already because of its sheer force. This political angle also helps explain why van Marum was so quick to publish a treatise describing the machine itself and detailing the experiments he had already conducted in the few months of its existence – although a genuine desire to share these results and contribute to the body of scientific knowledge as a whole are, as ever, equally indisputable with van Marum. There is no reason to doubt his statement in the publication's preface that "My principal object in making so great an effort to obtain a greater electrical force and to experiment with it, has been no other than to satisfy my desire to contribute something to the advancement of Natural Science, a science which, as it gives us more than any other human knowledge, some insight into the great wisdom of the Creator, I hold in the highest respect."[13]

Yet it is perhaps equally revealing that an immense budget was reserved for the illustrations accompanying van Marum's descriptions of the electrostatic generator. Amazingly, the costs for the prints that were included in the first treatise ultimately even exceeded those of the machine itself![14] As the adage goes, "a picture says more than a thousand words", and the more impressive an image, the more likely it will leave an indelible impression on the reader's memory. If the aim of the illustrations accompanying the treatise was indeed not only to help the reader understand the experiments and their results, but also to impress the reader, this was part of a longer term strategy on van Marum's part: in the instructions van Marum had drawn up for himself as director of Teylers Museum in 1784 he had already mentioned such illustrations.

Another point van Marum included in the 1785 treatise probably as much out of a sense of genuine altruism as for the purpose of piquing fellow experimenters' curiosity in an effort to engage with them, was an offer to perform any experiment suggested to him by others. He even promised not to be selective about the experiments he performed, writing:

""[…] I invite every Physicist (and this is the main reason which prompted me to an early publication of the description of this machine and of the experiments with it, demonstrating its great power) to kindly let me know his ideas or views on further experiments, which, with the aid of so great a force as is provided by this machine, may give any hope of leading to some fresh discovery. Any experiments so suggested I will gladly carry out, provided the required equipment is available, and report on the result in the first sequel to this volume, specially mentioning the name of whomsoever has given me the idea for such an experiment."[15]

[13] Marum, "Description of a Very Large Electrical Machine Installed in Teyler's Museum at Haarlem and of the Experiments Performed with It," 7.
[14] Wiesenfeldt, "Politische Ikonographie von Wissenschaft: Die Abbildung von Teylers 'ungemein großer' Elektrisiermaschine, 1785/87," 222.
[15] Marum, "Description of a Very Large Electrical Machine Installed in Teyler's Museum at Haarlem and of the Experiments Performed with It," 7.

Although the actual publication of the description of the experiments suggested by others was delayed for many years, only coming out in 1795, van Marum apparently was contacted by many fellow experimenters in the immediate aftermath of the first treatise, and did keep his promise. As he reported to his fellow members of the Second Society in October 1785, "after the publication of the experiments that had been carried out with the large electrostatic generator belonging to this Foundation" he had been "stimulated from all sides by many prominent men to carry on with these experiments, and to continue them in all possible ways, while they promised to cooperate, and to communicate their own findings".[16]

Van Marum saw to it that his treatise was widely circulated, i.e. sent to academies around the world, from Petersburg to London. What's more, he did not only wait for other scholars to approach him, but actively sought out other researchers whom he thought might be interested in his results.

That he managed to speak to Benjamin Franklin was already mentioned before. This happened during a trip of van Marum's to Paris, for which he set out in June 1785. He had already been elected a foreign correspondent of the *Academie Royale des Sciences* two years previously, but now set out to acquaint himself with this illustrious institution, taking with him letters of recommendation from Petrus Camper, and copies of the treatise on the electrostatic generator.[17] Franklin was about to leave France to return to America, but agreed to see the young Dutchman just two days before his departure. In all likelihood the main reason the famous American granted van Marum some of his scarce time was that the latter claimed to have found proof of Franklin's one-fluid theory of electricity. At the time there was much debate about the nature of electric charges, the general assumption being that there was such a thing as an electric fluid. But whereas many scholars were convinced there were two such fluids, corresponding with the two kinds of mutually exclusive and repelling charges that could be measured, Franklin posited that there was but one such fluid, and that a lack of this substance led to what he labeled as "minus" electrification, whereas an excess of this substance led to "plus" electrification.[18] What van Marum, together with Cuthbertson, had succeeded in doing was to create 24-inch long, "snake-like sparks of the thickness of a fountain-pen". As has been explained elsewhere, "[t]hese sparks had numerous side branches; by carefully noting their form and direction, they [van Marum and Cuthbertson] found that the latter was the same for all ramifications."[19] Van Marum, maybe a little hastily, concluded that this proved Franklin's theory. The great man himself as well as others such as Volta, fully accepted this. Van Marum reported Franklin as saying "C'est donc par là que ma theorie d'un

[16] "na d'uitgaave van de gedaane proeven met de groote electriseer-machine van deeze Fondatie"; "door veele voornaame mannen, van alle kanten [was] aangespoord, met deeze proef-neemingen te continueeren, en die, op alle mooglijke wijzen, voort te zetten, onder belofte van denzelver mede-werking, en mededeeling van hunne bevindingen"; "Notulen Tweede Genootschap", 27.10.1785, Haarlem, ATS, vol. 1382.
[17] Trevor H. Levere, "Martinus van Marum and the Introduction of Lavoisier's Chemistry in the Netherlands," vol. 1, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1969), 183–184.
[18] John L. Heilbron, *Electricity in the 17th and 18th Centuries: a Study of Early Modern Physics* (Berkeley; Los Angeles; London: University of California Press, 1979), 328–330.
[19] Levere, "Martinus van Marum and the Introduction of Lavoisier's Chemistry in the Netherlands," 177. See also: Heilbron, *Electricity in the 17th and 18th Centuries: a Study of Early Modern Physics*, 441–442.

fluide electrique simple est prouvee, est maintenant il faut renoncer à la theorie de deux sortes de fluids electriques."[20]

4. From Physics to Chemistry

But while his meeting with Franklin – whom he duly presented with a copy of the 1785 treatise – is sure to have constituted one of van Marum's personal highlights on his trip to Paris, what turned out to be equally, if not even more, important in the long term was van Marum's acquaintance with Antoine Laurent Lavoisier, some of his acolytes, and their ideas on chemistry.

The full significance lies in the revolutionary character of these ideas. It is too simple to claim that Lavoisier was the sole father of analytic chemistry, but one can hardly overestimate his importance in its establishment. Even if his work was heavily criticised and met with stark resistance by prominent contemporaries such as Joseph Priestley or Henry Cavendish, there is no denying that Lavoisier's contemporaries had huge respect for his towering intellectual capacities. Over the years he gradually evolved into a figurehead for a new approach to the composition of the material world – even before he tragically achieved ultimate cult status when he was beheaded in 1794, in the prime of his scholarly career, having misjudged the dangers of the Reign of Terror that followed upon the French Revolution.

Tragedy or political revolution was far from anyone's mind in 1785, however. Lavoisier himself was too busy to be able to engage with van Marum for very long, although that might have been the case if van Marum had been able to dine with Lavoisier upon the Frenchman's invitation.[21] Van Marum regretted having to refuse because of a prior appointment. Despite this, van Marum spent lots of time with Gaspard Monge and Claude Louis Berthollet, two eminent and ardent supporters of Lavoisier's and accomplished experimentalists in their own right.

Van Marum's own history can serve to illustrate just how groundbreaking Lavoisier's ideas on chemistry were. Recall how the topic of the treatise van Marum had submitted in reply to Teylers Second Society's first prize essay competition, and for which he had received a gold medal, had been "phlogisticated and dephlogisticated air". "Phlogiston" was a hugely important, yet elusive, postulated chemical substance that was invoked in almost every explanation of chemical processes at the time. The idea was that every combustible substance contained this phlogiston, and released it upon combustion. Other processes, which would

[20] As quoted in: Levere, "Martinus van Marum and the Introduction of Lavoisier's Chemistry in the Netherlands," 177.
[21] Martinus van Marum, "Journal Concerning Physics and Natural History, and My Communications with Scholars During My Stay in Paris in July 1785 (Journal Physique de Mon Sejour à Paris 1785)," ed. E. Lefebvre, J.G. de Bruijn, and R.J. Forbes, vol. 2, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1970), 225.

today be referred to as the oxidation of metals, were explained with the aid of phlogiston as well.

What Lavoisier now did was dispense with this "phlogiston". Aided by the increasing realisation that there were different types of "air", the subsequent emergence of pneumatic chemistry and above all the discovery of "dephlogisticated air" (later termed "oxygen") by Priestley and Scheele in the early 1770s, Lavoisier rendered phlogiston obsolete by postulating that combustion led to a recombination of the combustible substance and some part of "air", specifically oxygen. Crucially, he underscored this through precise measurements of the substances and the air samples in which controlled combustion took place. This was particularly important because one major issue surrounding phlogiston had always been the question of weight loss: why could substances gain weight during combustion, if they lost phlogiston? Answers were complicated by the elusiveness of phlogiston, with speculation going as far as to attribute negative weight to this mystery substance. Lavoisier now cunningly demonstrated that all weight changes could be attributed to the air involved in combustion, i.e. that the total weight of all substances – air included – remained the same.

All this is not to say that these revolutionary ideas were immediately accepted by Lavoisier's peers. On the contrary, after years of controversy his form of chemistry was only just beginning to gain traction when van Marum visited Paris. The discovery that water was a compound of oxygen and hydrogen formed a milestone on the way to the general acceptance of Lavoisier's ideas. At the same time however, many controversial issues remained. Almost ironically, for instance, Lavoisier had dispensed with phlogiston, but introduced a new elusive substance, the "caloric", which was associated with heat. Caloric theory remained in use until well into the 19th century, before being replaced by a mechanical theory of heat.

What is important here, however, is that van Marum returned from Paris excited by the possibilities and the elegance of what was referred to as the "new chemistry". The conclusive experimental evidence presented to him by Berthollet and Monge, along with the relative simplicity, i.e. elegance, of Lavoisier's theory had convinced van Marum that the eminent Frenchman was on to something.[22] He now set out to corroborate what he had learnt, and subsequently convince his fellow chemists in the Netherlands of the new theory's merits.

To this end, he started experimenting with the electrostatic generator again as soon as possible, again drafting in Paets van Troostwijk for help, particularly where the combustion of gases was concerned. Although they were not convinced instantly, Paets van Troostwijk and Dieman soon adhered to the new chemistry as well.

The results of their experiments were published two years later, in what was titled the "First Sequel to the Experiments performed with Teyler's Electrical Machine", again published as a

[22] For his reasons for accepting Lavoisier's system see: Levere, "Martinus van Marum and the Introduction of Lavoisier's Chemistry in the Netherlands," 190–214; Snelders, "Martinus van Marum En de Natuurwetenschappen," 167–168.

separate volume of the Proceedings of Teylers Second Society.[23] The final section contained a thirty-page summary of Lavoisier's ideas in Dutch, written by van Marum, and titled "Outline of the Teaching of M. Lavoisier" (*Schets der Leere van M. Lavoisier*). In what can be seen as typical of the incredible speed with which van Marum went to work, this proved to be the world's very first comprehensive, textbook-like overview of Lavoisier's new chemistry.[24] Even the Frenchman himself only completed his own – obviously far more detailed and far-reaching – publication titled *Traité élémentaire de chimie* some two years later, in 1789.

5. Less isn't More

On a different level, what is striking about van Marum's experiments at Teylers Museum up until this point is that they were all performed with the electrostatic generator. There is a very simple reason for this: until 1789 the museum's entire instrument collection effectively consisted only of Cuthbertson's machine and some accessories. This machine had of course not come cheap, and it provided van Marum with plenty of opportunities in itself of performing experimental research – but it was not as if he did not want to expand the collection. On the contrary, much to his chagrin, the trustees pretty much refused to allocate the museum any extra funds after 1784. This was not only the case with respect to the instrument collection: when van Marum had exceeded the budget the trustees had granted him for acquiring geological specimens for the museum at an auction in April 1785, he tried to sell them "a Beautiful Piece of petrified Wood" which he had acquired for f100,- without checking with his superiors first, presumably arguing that it fit in well with the rest of the collection. The offer was refused, however. And even more importantly, van Marum was informed that the trustees "have decided […] for the time being not to spend more money on this Area".[25]

There were a number of reasons for this tightening of the purse strings. One of these was surely that the trustees had just lost their court case against P. Klaarenbeek, and saw themselves forced to pay out a considerable portion of Teyler's assets to Klaarenbeek as a legal heir. Other reasons were the high costs incurred by the construction of the museum itself and the construction of the new almshouse, which had only just begun. Van Marum recalled

[23] Martinus van Marum, *Eerste Vervolg der Proefneemingen met Teyler's Electrizeer-Machine in 't Werk gesteld*, vol. 4, Verhandelingen uitgegeven door Teyler's Tweede Genootschap (Haarlem: J. Enschedé; J. van Walré, 1787). This has recently been translated into English and republished: Martinus van Marum, "First Sequel to the Experiments Performed with Teyler's Electrical Machine," vol. 5, Martinus van Marum: Life & Work (Leyden: Noordhoff International Publishing, 1974), 59–144.
[24] Levere, "Martinus van Marum and the Introduction of Lavoisier's Chemistry in the Netherlands," 188.
[25] "een Schoon Stuk versteend Hout"; "oordeelen […] aan deezen Tak vooreerst niet meerder tekoste te moeten leggen"; "Directienotulen", 29.04.1785, Haarlem, ATS, vol. 5.

later in life that he had once been told by the trustees: "[w]e have built the Museum, we have to leave something for our Successors as well."[26]

Yet by 1787 the situation had begun to change again. The almshouse, for one, was completed in that year. Just as importantly, the political turmoil of the previous years came to an end, albeit temporarily. The Patriot uprisings, of which Haarlem had been one of the centres and in which many of the trustees such as van Zeebergh were heavily involved, were put down with the help of the Prussian army, and the House of Orange had been reinstated. As a result, the overall economic and financial situation will have stabilised a little as well. Van Marum's Orangist sympathies had evidently not gone completely unnoticed at this point, as he was offered a seat on the newly formed town council of Haarlem in 1788 – whereas van Zeebergh was ejected from his. Van Marum however had never shown any real interest in matters of politics, and must also have been acutely aware of the fact that the issue was more than a little sensitive. The director of Teylers Museum sent a letter to the Prince of Orange turning down the offer.[27]

Van Marum later recalled that he had used this as leverage to increase the budget at his disposal at the museum.[28] Whether the trustees, and van Zeebergh in particular, were really susceptible to their employee's argument that he had now proven that he was devoting his all to Teylers Museum is debatable, all the more so because first indications that the collection could be expanded actually date from before the Prussian army's intervention in the Dutch Republic.[29] But, be that as it may, the fact of the matter is that by the end of 1788 van Marum was indeed being provided with money to expand the collections. And in no small amounts, either, as was soon going to transpire.

6. And then there was More

This of course had a profound effect on the museum. It was particularly relevant in two ways. Firstly, the instrument collection was expanded; secondly, the museum itself expanded when a separate laboratory was constructed for van Marum in 1790.

The reason it is worth focusing on these two developments in particular is because they bear great relevance both to the history of the museum as a whole, and the status of the instrument collection therein. More specifically, one could say the instrument collection itself was not so much expanded as actually only established at this point – it had, after all, essentially only

[26] "Wij hebben het Museum gebouwd, wij moeten ook wat voor onze Successeuren overlaten." Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 26.
[27] W. W. Mijnhardt, *Tot heil van 't menschdom: culturele genootschappen in Nederland, 1750-1815* (Amsterdam: Rodopi, 1988), 310–311.
[28] Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 27.
[29] "Notulen Tweede Genootschap", 02.03.1787, Haarlem, ATS, vol. 1382.

consisted of the electrostatic generator before, even if the trustees had given van Marum permission to build an entire collection of scientific instruments as early as 1784. But it was only after 1788 that van Marum could start acquiring instruments systematically. In fact many of the instruments, that are still considered the most prominent of the museum's collection, were all acquired within the space of just a few years.

Whereas building this collection had an immediate impact on the museum, the real significance of the second development – the establishment of separate laboratory premises – lies more in the long term. More to the point, this can be seen as a first step towards "taking the science out of Teylers Museum". After van Marum had exhausted the electrostatic generator's potential for new discoveries and stopped performing experiments with it in the Oval Room, and after he had been provided with the more suitable premises of a laboratory to conduct further experiments with other instruments, the Oval Room ceased to function as a place of experimental research. This is not to say that it no longer functioned as a place of research – on the contrary, the fossil collection it housed remained the object of detailed and systematic study which could only be performed in the Oval Room itself at least until new premises were built to accommodate the geological collections in 1885; but the Oval Room ceased to function as the kind of premise where sparks could fly or gaseous mixtures explode.[30] This was all the more the case after electrostatic generators in general had been rendered obsolete by the discovery of the Voltaic pile at the start of the 19th century.

Some caution and attention to detail is called for here. Van Marum had already performed experiments outside the museum long before 1788. Two years before the Foundation constructed its own laboratory, van Marum performed a series of experiments through which he sought to corroborate Lavoisier's theories – although these experiments were supported financially by the Teyler Foundation, van Marum conducted them "in my own residence [i.e. on the Holland Society's premises], as the requisite facilities were lacking at the time at Teylers Foundation".[31] And even before Teylers Museum had been built, van Marum had conducted chemistry experiments as part of his prize competition essay on phlogisticated and dephlogisticated air. Presumably he would have done so at the Holland Society's premises as well.

So, strictly speaking, the Oval Room never functioned as a "laboratory", in that it was only used for experiments that were connected with the electrostatic generator, and a distinction between the museum and other laboratory premises had already been in place before the addition of a laboratory funded by the Teyler Foundation in 1790. However the crucial point – and the one that was to become especially significant in the long term – is that the Teyler Foundation's organisational structure now included both a museum and a laboratory. As "museums" were increasingly associated with the public display of works of fine art over the course of the nineteenth century, and the exact sciences simultaneously became increasingly

[30] On sparks and explosions see: Levere, "Martinus van Marum and the Introduction of Lavoisier's Chemistry in the Netherlands," 177–181.

[31] "bij mijne woning, daar hiertoe, bij Teijlers Stichting, toen nog de gelegenheid ontbrak"; Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 36. On the Teyler Foundation's financial support (which amounted to f500,-) see: "Directienotulen", 31.10.1788, Haarlem, ATS, vol. 5.

specialised and dependent on precise measurement, this distinction became ever more pronounced.

Comparatively little is known about the original laboratory itself. One reason so little information on it has been preserved is probably that it was considered more of a workshop. The relative disdain for the laboratory mirrors the low esteem in which practical labour and research were held in comparison to the scholarly exercise of the mind – as represented by the far more magnificent Oval Room. It is not even clear where exactly the laboratory was installed. It appears to have been situated in one of the houses adjacent to the Foundation House. In his recollections, van Marum wrote that in 1790 "van aangrenzende woningen, een Chemisch Laboratorium, zoo als ik het verlangde, is ingerigt geworden".[32] An announcement from the time of the laboratory's establishment itself, published in the literary journal *Algemeene Konst en Letterbode* in 1791, provides just a little more detail, and is worth quoting at some length. It says that

"recently, as a result of joining and renovating two adjacent rooms, a spacious and well-appointed *Laboratory* has been attached to the Foundation House, equipped with the requisite instruments for Physical and Chemical Experiments and Investigations: where our Dr. *van Marum*, well-known in the world of learning, to whom the directorship of the Physical and Natural History Cabinets as well as that of the Library of Teylers Museum [...] has been entrusted since 1784, is now in a position to carry out, for the advancement of our knowledge of nature, in particular such Physical investigations as are too expensive or too laborious for most Physicists [*Natuurkundigen*] to do at their own expense."[33]

So the laboratory premises evidently consisted of two rooms or maybe even apartments (the Dutch word *woning*, translated above as "room", was used ambiguously) that had been conjoined and refurbished.

It is interesting to note that in 1790 there is talk of a "Physical and Chemical Experiments and Investigations", whereas by about 1820, when van Marum penned his recollections, he only referred to the laboratory as a "Chemical Laboratory" (*Chemisch Laboratorium*). Even though van Marum had certainly not lost interest in physics and used the 1788 windfall to acquire a wide range of instruments relevant to the analysis and demonstration of physical principles (as will be shown below), one can safely assume that van Marum's primary goal in having the laboratory established was the pursuit of chemical knowledge. Chemistry, after all, was his most recent and foremost interest during this period; What's more, the term "laboratory" was

[32] Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 37-38.

[33] "er is ook, kortlings, door het aantrekken en vertimmeren van twee naast elkanderen gelegene Woningen, een ruim en ongemeen wel ingerigt *Laboratorium* aan het Stichtingshuis gehegt, en met den nodigen toestel tot Physische en Chemische Proefnemingen en nasporingen voorzien geworden: waar door onze, by de geleerde waereld, zo bekende Dr. *van Marum*, aan wien de Directie der Physische en Naturalien Kabinetten, nevens die der Bibliotheek van Teylers Museum [...] zedert 1784 is opgedragen, zich thans in staat gesteld vind, om [...] ter bevordering der Natuurkennis, inzonderheid zodanige Physische nasporingen te doen, als voor de meeste Natuurkundigen te kostbaar of te omslagtig zy, om voor hun eigene rekening ondernomen te worden." "Berigten, Nederlanden: Haerlem," *Algemene Konst- en Letter-Bode, voor meer- en min- geoeffenden*, December 23, 1791, 204.

used predominantly in conjunction with chemical research at the time – generally speaking it only began to be associated with physics some decades later; van Marum had also explicitly asked for funds to extend the premises for chemical research at the Holland Society just a year earlier; and after van Marum's death in 1837, his successor, Jacob Gijsbert Samuel van Breda, summarized what his own plans were for the instrument collection, and only then turned to the laboratory, and the "instruments" and the "Chemicals and Reagents" it [the laboratory] housed.[34]

But if the laboratory was conceived as a chemical laboratory from the outset, then why emphasise its potential for further research in physics? Again, this can be explained at least partially if one sees the argument as part of a larger rhetorical strategy. The point is that the electrostatic generator's successes were indisputable, and not only van Marum, but the Foundation and in a sense the entire town of Haarlem were basking in the glory of playing host to such a famed device as it caught the scholarly community's attention. The idea of continuing on down the same path might have evoked images of fame and glory amongst the literary journal'sreaders. What's more, analytic chemistry was still in its infancy, whereas electrical research had long been a central part of Dutch scientific culture.[35] It has even been said elsewhere that van Marum's "experimental investigations into the new chemistry were initially disguised as electrical researches" because "[e]lectricity was a secure field whence Van Marum could investigate firm territories".[36]

In fact, this was not the first time van Marum invoked his past successes with the electrostatic generator: he had already done so when he drew up his acquisition policy for the instrument collection together with the Second Society, suggesting "that each instrument that one has manufactured, should be made to the highest specifications possible, flattering oneself that they will then, just like the big Electrostatic Generator, be able to serve the advancement of our Knowledge of Nature."[37] Van Marum wrote this in June 1789, and the fact that he is suggesting only the best instruments money could buy should be acquired, provides an indication just how much money really was available at this point.

[34] "werktuigen"; "Chemicalia en Reagentia"; Van Breda to Directeuren Teylers Stichting, 28.08.1839, Haarlem, ATS, vol. 23.
[35] On electrical research in the Dutch Republic around 1800 see: Lissa Roberts, "Science Becomes Electric: Dutch Interaction with the Electrical Machine During the Eighteenth Century," *Isis* 90, no. 4 (1999): 680–714.
[36] Trevor H. Levere, "Teyler's Museum," vol. 4, Martinus van Marum: Life & Work (Leyden: Noordhoff International Publishing, 1973), 47.
[37] "dat men elk werktuig, het geen men […] zal laaten vervaardigen, zo volkomen liet maaken, als zulks te verkrijgen is, zich vlijende, dat zij dan, even als one groote Electriseer-Machine, ter bevordering der Naturkennis zullen kunnen dienen." "Beredeneerd Plan voor het aanleggen van een Cabinet van Phÿsische en Mechanische Instrumenten in Teyler's Museum", c. 06.1789, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9.

7. Van Marum's Acquisition Policy

It is worth taking a closer look at van Marum's acquisition policy. Not just because it formed the basis upon which the core of Teylers Museum's instrument collection was built over the next few years, but also because it provides more – and more detailed – information on the criteria according to which van Marum went about purchasing items for the collection. However, some caution is again called for here, in the sense that the plans he drew up need to be seen as a snapshot of his interests at this specific point in time. Even though, overall, his range of interests remained remarkably consistent throughout his long life, the way he "discovered" and subsequently championed Lavoisier's analytic chemistry has already shown how the main focus of his interest could shift every few years. It must therefore not come as too much of a surprise that by the end of the 1790s hardly any instruments were still being acquired for the museum. And by the beginning of the new century funding for the museum's scientific collections had been put on hold again for a variety of reasons anyway.

But that was still a long way off when it first became clear that a windfall was coming van Marum's way. As was already mentioned above, the first indication that the trustees were willing to pay heed to van Marum's wish of expanding the collections came in 1787. On March 2nd of that year, van Marum informed his fellow members of Teylers Second Society

"that he had been asked by the Lord Pensionary van Zeebergh to present a plan to the Trustees on the part of this Society according to which, from time to time, Teylers Museum could be provided with Physical Instruments and models of various machines".[38]

The crucial words here were still "from time to time". Nevertheless, van Marum of course did not let this opportunity pass, and upon informing the Second Society of the trustees' offer had already prepared "a plan [...] in which were contained and reported those instruments and models that were judged by Mr van Marum, considering the organisation of this Foundation, to be the most useful and the least dispensible."[39]

This "plan" appears not to have been preserved, and no mention of either van Zeebergh's offer or van Marum's plans is made in the corresponding notes of the trustees' meetings. What was recorded by the Second Society, however, is that its members unanimously decided to leave the matter in van Marum's hands, and fully approved the plans he had presented them with. As the minutes read:

"During the general discussion Mr van Oosten de Bruijn, admitting his complete ignorance in physics and mechanics, wished to refer to the opinions of the other Members of this Society, who have unanimously declared their approval of this plan conceived by the said Mr van

[38] "dat Zijne W.Ed. door den Heer Pensionaris van Zeebergh was verzocht om aan Heeren Directeuren, van wegens dit Collegie, over te geeven een plan, waarop, van tijd tot tijd, Teijlers Museum van Physische Instrumenten, en modellen van verscheide werk-tuigen, zouwde kunnen worden voorzien"; "Notulen Tweede Genootschap", 02.03.1787, Haarlem, ATS, vol. 1382.

[39] "een ontwerp [...] waarin waren vervat en opgegeven die instrumenten en modellen, welken, naar inrichting van deeze Fondatie, door den Heer van Marum geordeeld waren 't dienstigste, en minst t'ontbeeren te zijn." Ibid.

Marum, and it has therefore been decided that it will be presented to the Trustees in the name of the Society."[40]

All this meant that, when it began to transpire that there was actually a considerable amount of money available for the acquisition of items for the Foundation's collection, van Marum was not only well prepared, but also in full control of the situation.

In the minutes of the trustees' meetings first mention of the increase in funds for the museum was made on October 31st 1788. Van Zeebergh had evidently informed both learned societies

"that the Trustees were now, more than before, able to defray some expenses to procure such Machines and Books for the Musaeum as would be most pleasing and useful to the Societies".[41]

The members of the Second Society had discussed this on October 30th – although the "discussion" had again essentially consisted of van Marum's pre-conceived plans being seconded by the other members of the Society. The initial idea appears to have been to buy some instruments at the auction of the collection of the recently deceased professor Johannes Nicolaas Sebastiaan Allamand from Leiden. Having inspected the instruments available, van Marum however did not consider them suitable, most of them being in bad shape and overpriced.

He therefore informed his fellow members of the Society that he "[het] beter oordeelde aan de Heeren Directeuren van wegens die Collegie voortedragen het laaten maaken van nieuwe instrumenten"

He therefore informed his fellow members of the Society that he "judged it better to propose to the Trustees on the part of the Society to have new Instruments made", and suggested three instruments for research purposes: a vacuum pump, a pressure pump and an "excellent" microscope [*een best microscoop*], "which is sometimes needed even in the examination of the electrical experiments". The microscope was to be ordered with John Adams in London. Finally, van Marum was hoping to obtain funding for a series of experiments to determine the chemical composition of water, "which, Mr van Marum said, he had expressly been requested to do by the Members of the Royal French Academy".[42]

The trustees agreed to all of this the following day. Interestingly, overnight van Marum also appears to have added a telescope to the list he presented the trustees with – maybe he was

[40] "Waarop omvraage gedaan zijnde heeft de Heer Van Oosten de Bruijn, erkennende zijne volstrekte onkunde in phÿsicis & mechanicis, verzocht zich te mogen refereeren aan 't oordeel der andere Heeren Leden van dit Collegie, welken eenpaariglijk hebben gedeclareerd dit door den meer gemelden Heer Van Marum geconcipieerd plan t'approbeeren, en is midsdien geresolveerd, dat 't zelve in naam van het Collegie aan Heeren Directeuren zal worden overgegeeven." Ibid.

[41] "dat HH.DD. thans meerder dan sints eenigen tijd in staat waren om eenige Uitgaven goed te maaken ter vervullinge van het Musaeum met zodanige Werktuigen en Boeken als der Genootschappen meest aangenaam en nuttig konden zijn"; "Directienotulen", 31.10.1788, Haarlem, ATS, vol. 5.

[42] "[het] beter oordeelde aan de Heeren Directeuren van wegens die Collegie voortedragen het laaten maaken van nieuwe instrumenten"; "welke zelfs in de beschouwing der electrische proeven zomtijds van nooden is"; "waartoe de Heer van Marum zeide door de Leden der Ko. Franse Akademie zeer te zijn aangezocht"; "Notulen Tweede Genootschap", 30.10.1788, Haarlem, ATS, vol. 1382.

beginning to sense that there was no shortage of funds, and that the trustees were inclined to spend the excess money available. Perhaps this was also what induced him to suggest obtaining the optical devices from John Dollond's, instead of from George Adams' workshop. John Cuthbertson was to be tasked with constructing the two pumps, for the handsome maximum total of f1000,-.

Both the trustees' goodwill and the available fund appear not to have been reduced over the course of the following months. In fact, the Foundation was not only providing van Marum with money to acquire items for the museum's collection, but also Wybrand Hendriks and a member of the Second Society, Willem Anne Lestevenon, who was residing in Italy to avoid the fallout from the political tension in the Netherlands – he had been a staunch Patriot.

So, in June 1789, the records show that van Marum again approached the trustees with a new, more extensive list of items he wanted to purchase for the museum.[43] Again, he was granted everything he had asked for. This list has been preserved amongst van Marum's personal papers, and it is remarkable not only in its scope – a large burning glass, various pyrometers and thermometers, and powerful natural and artificial magnets had been added to the list of research tools drawn up the year before – but also in that it included two further categories of instruments alongside those research tools.

The first of these new categories van Marum described as "models of Machines, that can be used in society to the general benefit, in particular such as are in use abroad". He wanted to include these specifically "so that such useful machines become better known here, and it will be easier to judge which of them could be imitated here with benefit, or that our machines could be improved after those in use in other countries".[44] What he had in mind were water mills, dredging machines, pile drivers, cranes, pumps, fire hoses and steam engines, as well as an assortment "of the best machines that are used in the shipping industry", such as "Harrison's chronometer, octants, sextants, azimuth-compasses, etc."[45]

Together with the instruments acquired for research purposes, all of these items could be "easily placed in the available glass cabinets that are present". Note however that this was before the addition of the laboratory premises.

As far as the instruments' presentation was concerned, it is also interesting to note that van Marum added three items to the list predominantly for aesthetic reasons – these instruments were not placed in a category of their own, but simply added to the enumeration of instruments without stating how they were related to the other categories. The two globes that had already been discussed before the Oval Room was even completed resurfaced, and were

[43] "Directienotulen", 12.06.1789, Haarlem, ATS, vol. 5.

[44] "modellen van Werktuigen, die in de zamenleeving ten algemeenen nutte gebruikt worden, en wel voornaamlijk de zulken, die buiten s'lands in gebruik zijn"; "ten einde zodanige nuttige werktuigen bij ons te beeter kunnen gekend worden, en men dus te beeter zal kunnen beoordeelen, wat men hier van bij ons met voordeel zoude kunnen navolgen, dan of onze werktuigen naar die, welke bij andere Natien in gebruik zijn, zouden kunnen verbeterd worden"; "Beredeneerd Plan voor het aanleggen van een Cabinet van Phÿsische en Mechanische Instrumenten in Teyler's Museum", c. 06.1789, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9.

[45] "van de beste werktuigen, die tot de Scheep-vaart gebruikt worden", such as "Harrison's chronometer, octants, sextants, azimuth-compasses, etc."; Ibid.

to be placed "near the end of the table [the central flat-top cabinet], opposite the Electrostatic Generator, […] each on a separate pedestal, on which they should be able to be displaced if the table had to be moved when Electrical experiments were carried out"; there was talk of "a big Telescope of six or seven feet, of the kind that is now manufactured by the famous Herschel" to be placed on "the flat roof of the Museum" (presumably the roof-top observatory), and the Second Society also wished to place "in the middle of the table a large moving orrery, which will there, it is assumed, greatly serve as an adornment".[46]

Perhaps even more importantly though, the second of the two new categories of instruments, as defined by van Marum, was to complement the other two, and consist of "simple mechanical, hydrostatic, hydraulic and optical machines". The reason these simple machines were to be included in the museum's collection was that "the complex machines cannot be understood without knowing the simple ones".

In other words, there was now clearly an educational component to van Marum's acquisition policy. Instruments were not only to be purchased for their value as research tools, but also in order to demonstrate state of the art technology and general physical principles. At this point it needs to be stressed however that van Marum was not trying to set up an exhibition – the aim was not to create some kind of educational, self-explanatory display at Teylers Museum, let alone an exhibition that would have been aimed at, and been accessible to, the general populace. As will transpire from an analysis of visitors' travel reports below, even though Teylers Museum was open to all in principle, all available evidence suggests that access was still comparatively restrictive, and essentially reserved for members of the elite.

So then why include devices from these two new categories in the museum's collection? In all likelihood, van Marum was trying to establish himself as a popular lecturer. It is highly plausible that he would have seen himself as the last in a long line of famous Dutchmen such as 's Gravesande, Musschenbroek, or Fahrenheit, all of whom had become international figureheads of Newtonian experimental science through their immensely successful publications and presentations, devised not just for experts, but for a lay audience as well.

8. Increasing Popularity

Why an up-and-coming and evidently highly talented scholar such as van Marum would aspire to make a name for himself through popular lectures, rather than "pure research", may sound puzzling to contemporary ears. But in order to understand this it is important to realise

[46] "gevoeglijk in de tegenwoordige glazen kasten […] geplaatst worden"; "nabij het eind van de tafel, tegens over de Electrizeer-Machine, […] elk op een afzonderlijk pedestal, met welk zij verzet moesten kunnen worden, wanneer bij het doen van Electrische proeven de tafel moet verschoven worden"; "een groot Thelescoop van zes of zeven voeten, van dat soort, het welk thans door den beroemden Herschel vervaardigd wordt"; "het plat van het Museum"; "op het midden van de tafel een groot bewegend Orrerij, hetgeen men oordeelt al daar zeer tot cieraad te zullen kunnen verstrekken"; Ibid.

that the pronounced distinction between amateurs and professionals in science is something that only emerged over the course of the 19th century. At the end of the 18th century, the line between amateurs and specialists had not been drawn as sharply yet. Of course there were differences between amateurs and experts – van Marum for instance was very conscious of his status as an experienced expert in the description and analysis of natural phenomena; the restricted access to the inner sanctum of his studies, Teylers Museum, can be seen as part of an attempt to uphold that status – not so much in the sense that van Marum actively denied others interested in the natural sciences access to the knowledge held at Teylers, but in the sense that a certain sensitivity, etiquette, perhaps even good breeding was requisite to appreciate this workplace, and simply also not to damage the sensitive equipment it contained. Yet even though a certain exclusivity associated with any pursuit of knowledge in the name of science cannot be denied even during this period in history, what is important is that at the end of the 18th century the boundaries which defined that exclusivity were drawn differently from the way they were drawn at the end of the 19th century.

This brings us back to the distinction between amateurs and professionals: by the end of the 19th century the exclusive rights to any meaningful and trustworthy statement about natural phenomena had successfully been claimed by a community of specialists which in turn defined itself through its members' systematic training in the methods of experimental science and the mathematical evaluation of data. Put differently, the domain of "science" had been monopolised by professional "scientists".

The less permeable the boundaries delineating the scientific community became, the more the character of "popular" science changed too. Popular science was increasingly equated with the simplification of the thought patterns and explanatory systems "scientists" had adopted or devised. These simplifications were of no use within the community of specialists themselves; they could only be used whenever such a trained specialist ventured outside the boundaries of the community, or, perhaps, by those who acted as intermediaries between those on either side of these boundaries, i.e. "popularisers".

Now, the crucial point as far as van Marum's ambitions and the history of Teylers Museum are concerned, is that to van Marum – as well as his predecessors such as Fahrenheit or 's Gravesande – giving popular lectures would not have felt like venturing outside the impenetrable boundaries of some sort of community. They would not have considered themselves "popularisers" in the sense described above. They knew of course that they had to take their audience's prior knowledge – or lack thereof – into account, and they would have spoken differently amongst each other than they did in their lectures; but they would not have denied – or at least not as vigorously as "scientists" would by the end of the 19th century – that their audiences could fully grasp what they themselves had understood and were explaining, or perhaps even take up scientific experimenting. Their aim in giving a series of lectures was subtly, but crucially, different from the aims of later "popularisers" too: the aim was to spread the knowledge they had gained so that it could be adopted and applied by others, ideally for the betterment of society; vanity was involved, but to a far lesser degree and in a different manner than with later popularisers, who were far more interested in keeping their listeners in awe of both "science" and "scientists", cultivating the image of

brilliant, almost other-worldly discoverers and inventors. To some extent these changes are reflected in the emergence of "popular" science literature in the 19th century. 's Gravesande on the other hand wrote a book on Newtonian mechanics, *Physices elementa mathematica*, which circulated widely amongst fellow researchers and amateurs interested in Newton's new philosophy.

So, what, apart from the fact that he started acquiring models for Teylers Museum's collection, supports the idea that van Marum was trying to establish himself as a popular lecturer? Recall, for instance, that he had first built a reputation in Haarlem as a town lecturer. What's more, the acquisition plan he submitted to the trustees contained a direct reference to 's Gravesande, in that van Marum wanted to use the Newtonian's famous book containing descriptions of devices to demonstrate the laws of mechanics as a blueprint from which to select the models to be purchased for the museum.[47] Finally, van Marum had himself started giving a series of lectures on his research in the Foundation's name shortly before submitting this plan: in 1786, he first gave lectures on his research on the geological collection before members of the Second Society. After 1790, his audience included the trustees of the Teyler Foundation. By this time, he had broadened the scope of his lectures to include chemistry, not just geology. His lecturing culminated in a series of lectures before a far larger, general audience between 1795 and 1797. This was after the French Revolutionary Army had occupied the Netherlands, bringing with it a greater appreciation of the common "citoyen", at least rhetorically. In how far van Marum giving these particular lectures for a general audience was part of a cunning attempt on his part to gain favour with the new government is debatable. He certainly did not have to betray any of his principles in order to give the lecturers.

In fact, this is something that needs to be stressed: even though the preceding summary of van Marum's actions and ideas has been phrased largely in strategic terms and the focus lay on what was at stake for him personally, throughout his life van Marum always displayed a genuine, altruistic desire to pass on and spread whatever knowledge he had gained. This, as much as anything else, will undeniably have motivated him to acquire other instruments for the museum besides those he could use solely for research purposes.

There is one final point that supports the notion that van Marum saw himself as accepting some kind of baton that was handed down from earlier diffusors of knowledge such itinerant lecturers like Fahrenheit: his exquisite acquisition plan prompted him to go on a trip to London. At the time, the British capital was still the centre of the instrument making world, which was the main reason van Marum travelled there.[48] But in doing so he was also emulating generations of Dutch Newtonians. As has been pointed out by Trevor Levere, travelling to London was "in line both with Van Marum's own ambitions, and with the great tradition of experimental Dutch Newtonians".[49] 's Gravesande himself had become an

[47] Ibid.
[48] On London's status as instrument making capital of the world see for instance: Jim Bennett, "Instrument Makers and the 'Decline of Science' in England: The Effects of Institutional Change on the Élite Makers of the Early Nineteenth Century," in *Nineteenth-century Scientific Instruments and Their Makers*, ed. Peter R. de Clercq (Amsterdam: Rodopi, 1985), 13.
[49] Levere, "Teyler's Museum," 53.

adherent to Newtonian mechanics during a sojourn in London. And, in a way that affected van Marum on a more immediate level, his mentor Petrus Camper had recently travelled to Britain as well.[50] He was therefore able to provide his former pupil with letters of introduction, even though by this time the name van Marum was not unknown across the channel. Jan Ingenhousz, residing in Britain at the time, had suggested the trip and chaperoned van Marum during the first few days of his visit to London. Van Marum had also corresponded with notable British instrument makers and chemists such as Joseph Priestley on a range of issues. At one point his activities had led to a public disagreement with Henry Cavendish, which in turn was one of the main reasons van Marum was only elected to the coveted membership of the Royal Society some eight years after his visit to the illustrious institution.[51]

The trustees not only supported this trip of van Marum's, but actually paid for it too. This goes to show that they were willing to go to great lengths in supporting van Marum's activities. In his acquisition plan drawn up in 1789, van Marum had summarised:

"According to this plan Teylers Museum should be able to acquire a Cabinet of Physical and Mechanical Instruments, that has no equal in our country, and that is, as far as we know, also unparalleled in other countries."[52]

He was serious. And so – evidently – were the trustees in supporting this aim.

9. London and the Aftermath

In July 1790, van Marum thus left for England, "in order to set up permanent contacts there so as to acquire such machines as cannot easily or so well be obtained in this country at the moment", as the trustees' summary of his plans reads.[53] What they didn't mention in the minutes of their meetings, but must have been discussed as well, was van Marum's plan of finding an instrument maker who could be employed by the Teyler Foundation and assist him in Haarlem, an idea which the trustees supported.

Interestingly, it was once again van Zeebergh who emerged as van Marum's principal contact and champion amongst the trustees. Although van Marum was permitted to acquire

[50] Ibid., 63.
[51] On van Marum's campaign to be elected and the difficulties he encountered see: Trevor H. Levere, "The Royal Society of London," vol. 3, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1971), 33–40.
[52] "Volgens dit plan zoude men in Teylers Museum een Cabinet van Physische en Mechanische Instrumenten kunnen verkrijgen, zo als er niet alleen in ons land geen bekend is, maar waar van ook zo ver wij onderricht zijn, in andere landen geen gelijksoortig schijnt gevonden te worden." "Beredeneerd Plan voor het aanleggen van een Cabinet van Phÿsische en Mechanische Instrumenten in Teyler's Museum", c. 06.1789, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9.
[53] "ten einde aldaar eene vaste correspodentie op te rigten om zodanige Werktuigen welke thans hier te Lande niet gemaklijk of niet zo goed te bekomen zijn, te verkrijgen"; "Directienotulen", 18.06.1790, Harlem, ATS, vol. 5.

instruments up to a certain price on his own, he corresponded with the trustees frequently, securing their backing for his purchases. It is interesting to note that when van Marum had the possibility of acquiring a small camera obscura, van Zeebergh was so taken with the description of this device that he immediately granted van Marum permission to buy it.[54] This turned out to be the only time that he didn't check with his fellow trustees first. The camera obscura was removed from the museum's collection sometime in 1817.[55]

In London, van Marum visited a number of instrument makers' workshops such as those of Adams and Dollond, he met Joseph Banks, various members of the Royal Society, attended a meeting of that illustrious gathering of men, visited the Royal Observatory in Greenwich, and made a pilgrimage Newton's grave.[56] He then moved on to Slough, where William Herschel resided and had just had the world's largest telescope constructed, with a 40 foot focal range. This was out of order when van Marum visited, but the Dutchman was already blown away by what he saw when he gazed through one of Herschel's smaller, but still comparatively large, 20 foot telescopes: it was so powerful that nebulae became discernible. Van Marum must have felt he had found a kindred spirit in Herschel, whose philosophy of having ever larger telescopes constructed and thereby successfully pushing the boundaries of astronomy must have chimed well with van Marum's conviction that he would be able to settle various issues with the Cuthbertson electrostatic generator because of the machine's sheer force. Van Marum ordered a seven foot telescope for Teylers Museum. Finally, he travelled on to Birmingham, where he visited the factory of Watt and Boulton, and was hoping to obtain a model of their steam engine. Fearing patent infringements, the inventors however pursued a very strict policy of not distributing any such models, and did not make an exception for van Marum, who began to suffer from a hacking cough caused by the polluted air of this industrial city.

As planned, van Marum had also struck a deal with an instrument maker in London. Frederik Willem Fries, of Swiss origin, had agreed to come to Haarlem if he was provided with at least an equal salary to the one he was earning in London, and if he was provided with the funds to purchase new tools, because trade laws prohibited him from bringing his own to the Netherlands from London. Both demands were considered perfectly reasonable, and in November 1790 van Marum was able to introduce Fries to the members of the Second Society in Haarlem.[57]

Fries immediately went to work, and together with van Marum constructed two devices – in all likelihood in the new laboratory that must have been completed precisely during this period – over the course of the next months that received a lot of praise for many years to come. The first of these was an improved, smaller electrostatic generator. Its most striking

[54] Levere, "Teyler's Museum," 60.
[55] I.Q. van Regteren Altena, J.H. van Borssum Buisman, and C.J. de Bruyn Kops, *Wybrand Hendriks 1744-1831* (Haarlem: Teylers Museum, 1972), 11.
[56] For more detail on his activities in London see: Martinus van Marum, "Notes on a Voyage to London in 1790," vol. 2, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1970), 266–272; Levere, "Teyler's Museum," 53–65.
[57] "Notulen Tweede Genootschap", 19.11.1790, Haarlem, ATS, vol. 1382. The minutes erroneously state that Fries was originally from Strasbourg.

feature was that it only used one disc, rather than two, as was the case with all of van Marum's previous disc machines. More importantly however, it was the first disc machine that could generate either a positive or a negative charge. Up until that point, this had been the main advantage of the rival cylinder machines that to van Marum's chagrin were more popular than disc machines in England.[58]

The second device was a gasometer, which enabled a far cheaper demonstration of the decomposition of water that was so crucial to Lavoisier's analytic chemistry than was possible with Lavoisier's own devices, which had proved unaffordable for all but a few chemists. Alongside the 1784 electrostatic generator, this gasometer proved to be van Marum's most sensational device. Upon its completion he received many requests for copies to be made from academies across the world.[59]

But even though Fries was clearly excelling at his job, by April 1791 the poor man was feeling so homesick that, as van Marum phrased it three decades later, he had become "melancholy and peevish" and "incapable of continuing his work".[60] Perhaps this dismissive judgement – even if it was made years later – is indicative of a more general change of atmosphere at Teylers. A general pattern seems to emerge if one takes into account van Marum's relationship with his research associates from the 1780s: by the time van Marum returned from London Cuthbertson, Paets van Troostwijk and Deiman all had broken – or were about to break – their ties with van Marum. Was van Marum's hobnobbing with the elite of his generation going to his head? Cuthbertson became involved in a nasty public dispute on a series of improvements to the electrostatic generator. Having worked together so closely for almost a decade, the two men now flung accusations at each other of withholding information that was vital to the other's work, sullying each others' reputation. This altercation was carried out through the medium of articles in local scholarly journals. Some years later, Cuthbertson left the Netherlands and returned to his native Britain, after which he left too few traces to say what fate had in store for him. Even the circumstances surrounding his departure are hazy. It is likely that losing his best and by far most lucrative client – Teylers Museum – broke his business.[61] Paets van Troostwijk and Deiman were affected in a less profound manner. Together with other chemists predominantly from the Amsterdam region they set up the *Gezelschap der Hollandsche Scheikundigen*, after they had already shown that water could not only be decomposed, but could also be synthesised from its components, oxygen and hydrogen. They had drawn international attention with their demonstration, but van Marum had been little more than a bystander.[62]

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[58] Levere, "Teyler's Museum," 65.
[59] Ibid., 66.
[60] "droefgeestig en gemelig"; "tot het voortzetten van zijn werk geheel ongeschikt"; Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 38.
[61] On the available archival material on Cuthbertson see: Hackmann, *John and Jonathan Cuthbertson: The Invention and Development of the Eighteenth Century Plate Electrical Machine*.
[62] On the Scheikundig Gezelschap see: H.A.M. Snelders, *Het Gezelschap der Hollandsche Scheikundigen: Amsterdamse chemici uit het einde van de achttiende eeuw* (Amsterdam: Rodopi, 1980).

These developments did not mean that van Marum was becoming isolated. On the contrary, he continued to uphold his correspondence with researchers around the world, and remained one of the foremost scholars in his own country. In 1794 he was elected secretary of the Holland Society.[63] This was the highest position at the Society, roughly equivalent in status to that of the presidents of other countries' academies. The Holland Society remained the Netherlands only scholarly association of national scope until King Louis Napoleon created what was first known as the Royal Institute in 1808 (it was rechristened the Royal Academy some decades later), a process in which van Marum was intimately involved.

Neither did this mean that van Marum reduced the amount of research he performed. Besides numerous shorter articles, he published two major books before the turn of the century. The first of these, the *Second Sequel to the Experiments with Teyler's Electrical Machine*, came out in 1795.[64] It delivered pretty much what the title promised. The second book was published in 1798, and contained descriptions of improvements to various scientific instruments and chemical experiments van Marum had devised over the past years, much in the same way he had improved on Lavoisier's gasometer with Fries.[65]

10. Van Marum's Practical Appliances

This second book was testimony to another of van Marum's passions: he was adept at handling and improving scientific instruments and practical appliances, and even devised a range of new apparatus designed for the public good.[66] In the 1780s and the 1790s for instance he devoted time to the issue of fires. He used the electrostatic generator to find out what shape was best for lightning rods – the question of whether they were to be rounded or pointed was one that was not properly settled for decades to come – and also tried to improve the process by which fires were put out. To this end, he constructed a new, improved fire extinguisher, which he presented to the public in early 1795. His aim was to have such fire extinguishers placed at nodal points all over Haarlem, so that they would be easily accessible in case of fire. The Teyler Foundation, however, refused to finance this scheme. The trustees were most likely convinced this was not what Pieter Teyler had had in mind when he penned his will. What's more, from their neo-humanist outlook they would not necessarily have been enamoured with van Marum's proposal. Nevertheless, van Marum's ideas did not go unnoticed. To some extent, this was perhaps inevitable, given the spectacular nature of the

[63] Johan A. Bierens de Haan, *De Hollandsche Maatschappij der Wetenschappen, 1752-1952* (Haarlem: Tjeenk Willink & Zoon, 1970), 56.
[64] Martinus van Marum, "Second Sequel to the Experiments with Teyler's Electrical Machine," vol. 5, Martinus van Marum: Life & Work (Leyden: Noordhoff International Publishing, 1974), 145–240.
[65] Martinus van Marum, "Description of Some New or Perfected Chemical Instruments Belonging to Teyler's Foundation and of Experiments Carried Out with These Instruments," vol. 5, Martinus van Marum: Life & Work (Leyden: Noordhoff International Publishing, 1974), 239–298.
[66] For a detailed analysis of van Marum's work on practical appliances, see: R.J. Forbes, "Applied Technology," vol. 3, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1971), 278–328.

demonstration he organised in order to demonstrate how he would put out fire: a hut was constructed outside Haarlem and then set on fire, only so that it could be extinguished. News of the demonstration appears to have carried far. To his own surprise, van Marum was asked to restage the demonstration on a trip to Germany in 1798. He had explained and demonstrated the mechanism on a smaller scale at various other stops on the same trip, but on one of his last stops, in Gotha, upon returning to the town after having visited researchers in other places, he recorded: "I learned to my surprise that in my absence the Duke [of Weimar] had caused a hut to be made of the same size as the one I had set on fire and extinguished at Haarlem." Arrangements were then made to fill the hut with flammable substances in the same way as had been done in Haarlem – and van Marum seems to have miscalculated a little. "For want of tar I caused about 40lbs. of molten resin to be thrown into the straw" he reports, then laconically stating that "as a result the fire was much fiercer than in the Haarlem experiments". He then immediately adds, perhaps proudly: "however, I succeeded in extinguishing it with 4 to 5 buckets."[67]

Around the same time he was developing his ideas for a fire extinguisher, van Marum also came up with a ventilation system which would improve the quality of the air in enclosed spaces. It was initially devised for buildings – van Marum tested it on the Foundation's laboratory in 1796 – but he soon adopted it for use on ships too.[68] This can be seen as the culmination of a long-standing interest of his in the quality of air. As early as 1783 van Marum had devoted time to a treatise on unhealthy fumes and gases – together with Adriaan Paets van Troostwijk – which was published by the Batavian Society of the Experimental Sciences in 1787.[69]

Finally, van Marum's medical background showed on a number of other devices he constructed. In 1801 for instance he improved the design of a "Papin" cooking pot, with the aim of improving the poor's nourishment. During this period many inhabitants of Haarlem were dependent on charitable soup kitchens for sustenance. He also devised a bath that was supposedly to help cholera patients. And van Marum sought to apply the knowledge he had gained about the properties of air when he studied the best way to resuscitate victims of drowning.

By the time the 1798 treatise on improved chemical devices came out however, the focus of van Marum's interest had again begun to shift. Again, it is not that he had lost interest in the nature of electricity or the chemical composition of the material world. Van Marum in fact set the electrostatic generator in motion again at least twice during the early years of the 19th

[67] Martinus van Marum, "Journey to Kassel, Göttingen, Gotha, Erfurt, Weimar and Jena in 1798," vol. 2, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1970), 311.
[68] "Bericht van Doctor van Marum betreffende onlangs gedaane proefneemingen ter verbetering der luchtzuivering op groote scheepen," *Nieuwe Algemene Konst- en Letterbode, voor meer- en min-geöeffenden*, May 31, 1799. I am grateful to Huib Zuidervaart for drawing my attention to this article.
[69] Martinus van Marum and A. Paets van Troostwyk, *Antwoord op de vraage: Welke is de aart van de verschillende, schadelijke en verstikkende uitdampingen van moerassen, modderpoelen, secreeten, riolen, gast- of zieken- en gevangenhuizen, mijnen, putten, graven, wijn- en bierkelders, doove koolen etc? En welke zijn de beste middelen en tegengiften om de schadelijkheid dier uitdampingen, naar haaren verschillenden aart, te verbeteren, en de verstikten te redden?*, vol. 8, Verh. Bataafsch Genootschap Proefonderv. Wijsbegeerte (Rotterdam: Dirk en Ary Vis, 1787).

century. The first time was after Volta had discovered the eponymous Voltaic pile which, upon being perfected and in modern terms, was capable of creating a steady current.[70] Through his network of correspondents, particularly through Joseph Banks and Volta himself, van Marum was one of the first to be privy to the Italian's milestone discovery. Upon Volta's request, van Marum then soon set out to establish whether the electricity – or, to use the contemporary term, the electric fluid – generated by the pile was the same as that generated by a disc machine. What better disc machine to use than the huge one built by Cuthbertson in Haarlem? Together with an associate of Volta's, the professor from Kiel Christoph Heinrich Pfaff, van Marum spent ten days in late 1801 conducting a series of experiments in Haarlem. They came to the conclusion that the machine and the pile did indeed generate the same kind of electricity.[71]

The second time was almost twenty years later, after Hans Christian Oersted had discovered the phenomenon of electromagnetism. Van Marum lost little time in recreating the groundbreaking experiments that had led to this discovery.[72] But by this time, he was a septuagenarian, and although in good health, he must have started feeling the physical strain of working the electrostatic generator – together with assistants that were not getting any younger either.

So these two instances were exceptions. In his *Second Sequel* published in 1795 van Marum had in fact already stated that he felt electrical science was in a "stationary period", and that he did "not see for the present that there is any train of promising investigations which offer the prospect of interesting results".[73] And even though, at that point, he was still busily working on chemistry experiments, he recalled later how by 1798 he wanted to devote more time to the earth sciences and the museum's geological collection, "having completed the collection of physical and chemical instruments, as far as it seemed possible to me at the time". As he summarised in 1810: "Geology was then my favourite study."[74] It was to remain so until a huge row erupted between him and van Zeebergh in 1802. Before the turn of the century, however, apparently all was still well.

11. Down to Earth

Although Teylers Museum's instrument collection has been chosen as the vantage point from which to approach the history of the entire museum and this specific collection's history is

[70] Heilbron, *Electricity in the 17th and 18th Centuries: a Study of Early Modern Physics*, 494.
[71] Hackmann, "Electrical Researches," 362; Christoph Heinrich Pfaff, Carl Friedrich Kielmeyer, and Gregor Wilhelm Nitzsch, *Lebenserinnerungen* (Kiel: Schwers'che Buchhandlung, 1854), 134.
[72] Hackmann, "Electrical Researches," 369.
[73] Marum, "Second Sequel to the Experiments with Teyler's Electrical Machine," 147.
[74] "ayant achevé alors la collection des appareils physiques et chymiques, autant quíl me parût possibl dans ce tems là" ; "La Geologie fut alors mon étude cherie." Martinus van Marum, *Catalogue des plantes, cultivées au printems 1810; dans le Jardin de M. van Marum à Harlem* (Haarlem, 1810), v.

therefore disproportionately emphasised throughout this study, for a full appreciation of Teylers Museum's history and the changes it underwent over the course of the 19th century it is also of pivotal importance to gain a sense of the importance and the general status of the museum's other collections – such as its geological collection. As far as the geological collection is concerned this is all the more so during van Marum's tenure, because all of the museum's scientific collections were still intimately linked in that they all fell under van Marum's purview – by the time Volkert Simon Maarten van der Willigen was put in charge of the instrument collection in the second half of the 19th century the geological collection and the instrument collection were no longer conjoined, but formed entirely distinct entities, albeit not yet spatially.

Moreover, as with the instrument collection, it was van Marum who essentially laid the groundwork for the subsequent curators' work in that he determined the focal points of the collection through his early acquisitions. Subsequent curators' own interests are clearly reflected in the collection's later development, but it is no exaggeration to say that if van Marum had not been in charge, the museum might never have established a fossil collection in the first place. His acquisitions for the geological collection therefore need to be seen in relation to his other activities, and, vice versa, in any assessment of the instrument collection's overall status within the context of Teylers Museum one needs to take the geological collection into account as well.

There are two crucial points one needs to be aware of when trying to understand the genesis of the fossil collection during van Marum's tenure. The first of these is that the earth sciences were undergoing fundamental changes around the turn of the century. The second point is van Marum's physico-theological approach to the study of nature.

As far as the first point is concerned, perhaps the most striking development was that the study of fossil bones was emerging as an area of research in its own right.[75] This in turn led to an increasingly narrow definition of "fossils": whereas at the end of the 18th century they were still defined as pretty much any solid material the earth divulged – van Marum stated that he wanted to build a collection of "Fossilia" – they were increasingly associated with the fossilized remains of living creatures by the early 19th century.

This in turn reflected the way, over the course of van Marum's lifetime, various branches of the earth sciences started to emerge in their current form. In fact the term "geology" itself only began to be used during this period. This had everything to do with a far more fundamental shift in the general thought pattern of earth scientists. More specifically, they began to historicise the earth. The Earth itself began to be seen as a product of nature, i.e. subject to nature's laws, and subject to the fluctuations of nature. This showed in two different ways. Firstly, the timeframe within which practitioners of the earth sciences considered the object of their study changed. The Earth itself need neither be eternal, nor the product of some fairly recent catastrophe or process of creation. Rather, there was now room for an intermediate timescale. That period of time might have included numerous catastrophic events

[75] The following paragraphs in this section are based on: Martin J.S. Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago: University of Chicago Press, 2005).

and revolutions, or – even though this notion was still a long way off – might have seen an evolutionary process. Secondly, that history now needed to be taken into account when studying the earth. As Martin Rudwick has summarised: "It can hardly be emphasized too strongly that this was a radically new feature on the conceptual landscape of the natural sciences: understanding and explaining the natural world began to be seen to entail its contingent past history as much as its directly observable present".[76]

Within the context of this study it would go too far to address the many intricacies and subtleties of this process of the historicization of the earth, but some caveats are called for: It would be far too simplistic for instance to frame these developments within some sort of opposition between "Science" and "Theology", or as a process through which the shackles of the biblical story of Creation were overcome. So too would it be to reduce these developments to the polemic that was raging between "Vulcanists" and "Neptunists" – this was, essentially, only about the puzzles basalt structures posed.

The area in which the issues surrounding the historicization of the earth came to the fore was the study of fossil bones. Perhaps the single most pivotal character in these developments was Georges Cuvier. He was a Frenchman who had spent a large part of his childhood in Southern Germany, began to make a name for himself as a promising scholar before the French Revolution, survived the ensuing political turmoil unscathed, and ended up as a professor at the Muséum d'Histoire Naturelle in Paris. There, after 1795, he drew on his superior knowledge of anatomy and studied a number of fossil bones, comparing them with similar known species, and came to the conclusion that many of these fossil bones were from unknown species. Crucially, he argued that these species were extinct. This idea was not entirely new in itself, but Cuvier's anatomical analysis proved far more solid and persuasive than what had been presented before. His publications sent ripples through the international scholarly community, being translated into many foreign languages.

The second of these publications contained a study of the bones of African and Indian elephants, and a comparison with similar, elephant-like fossilized remains that had been discovered in Siberia, i.e. mammoths. Interestingly, the specimens of the elephants Cuvier used had originally formed part of the collections of the Dutch Stadthouder in The Hague, and had only recently been brought to Paris from the Netherlands, alongside many other prize specimens from almost all of the public – and often also private – collections of the countries that had been defeated by the French Revolutionary Army.

12. The Prying Eyes of the French

It has already been pointed out in the previous chapter how the transferral of many European collections to Paris – and even more so their return upon Napoleon's final defeat – proved to

[76] Ibid., 6.

be a watershed in the history of collections and museums, and how in the Netherlands too this prompted the establishment of some of the first national museums. At this point it is therefore worth dwelling briefly on the question of how the French interest in Dutch collections affected Teylers Museum. Intriguingly, the prying eyes of the French turn out to have had no direct effect whatsoever on the collections at Teylers Museum. No items were removed from the Foundation's collections. Not that van Marum wasn't worried this might happen – on the contrary, as he recalled about three decades later:

"The arrival of the French, in January 1795, inspired not a little fear in me for the preservation of everything that had been brought together by me at Teylers Foundation, as I knew of several Cabinets either of Natural History specimens or of other things in Countries equally occupied by them, how much they had suffered by their requisitions."[77]

He might have had Francois-Xavier de Burtin's fossil collection in mind, which had been brought to Paris shortly before, after Burtin had fled Belgium.[78] Van Marum had met, corresponded with, and planned a joint acquisition with de Burtin in the early 1780s. And indeed, according to van Marum's account, it did not take long for two of the three French commissioners that had been dispatched to the Dutch Republic in order to oversee the annexation of the Stadtholder's collections to show up on his doorstep, "early in the morning", once the Stadtholder had fled the Netherlands and the French Armies had occupied the country. These two were Claude Roberjot and Barthélemy Faujas de Saint-Fond. (The third commissioner was André Thouin.) Both were no strangers to van Marum: He had gotten to know them on his journey to Paris ten years earlier, before the Revolution, and with Faujas he had corresponded since.

So, early in the morning of this unspecified day sometime in January 1795, they asked to see both Teylers Museum and the collections of the Holland Society. Van Marum of course obliged, but recalled how he was not able to conceal his worries: "When they looked at these collections, they perceived my fear that they would inspect some rare specimens with all too desirous eyes."Anxious to prevent the collections' annexation, by his own account van Marum then began to emphasise how he used the resources he was provided with for the general good, and argued how the removal of any part of the collections would seriously undermine his efforts. His old friends assured him they came with no bad intentions, and they would do everything in their power to preserve the collections in Haarlem. And indeed, nobody laid a finger on any of the items in the collections under van Marum's purview in Haarlem. Nevertheless, van Marum recalled how he had remained apprehensive: "From time to time one or another of these Commissioners return, sometimes alone, sometimes

[77] "De komst der Franschen, in Januarij 1795, verwekte bij mij niet weinig vrees voor het behoud van al het geene door mij, bij Teijlers Stichting, was bijeengebracht, daar het mij van verscheidene Kabinetten van Naturalia of andere zaken, in Landen, door hun op gelijke wijzen bezet, bekend was, hoeveel dezelven, door hunne requisitien, geleden hadden." Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 57.
[78] Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution*, 360.

accompanied by one or two other representatives, which occasionally renewed my fear for requisitions".[79]

Van Marum's written correspondence with the three commissioners supports his later account of the events. Although there is no mention of their initial visit, the letters show that van Marum was clearly aware of what was going on in The Hague. The Frenchmen kept him up to date on their efforts to pack up the former Royal collections and ship them to France – a total of 150 crates was eventually sent to Paris – and van Marum's tone suggests he was clearly willing to oblige wherever necessary in order to pacify the occupiers.[80] On the other hand, the letters also suggest a certain intimacy and trust amongst the correspondents, and certainly a high degree of respect for van Marum and his achievements on behalf of the French. Rather than obstruct his work, they seem to have supported their old acquaintance, and treated him like a Dutch brother-in-arms. In February Roberjot saw to it that van Marum was exempted from billeting, for instance.[81] And they appear to have carried no animosity in later years either. When van Marum travelled to Germany in 1798 and spent some days in Kassel, Faujas happened to be in town as well, and repeatedly suggested visiting collections or going on excursions together. Reading van Marum's account of this journey, one gets the impression he almost had to fend off his French friend. His last entry in Kassel for instance reads: "Faujas tried to persuade me to remain a few days with him at Cassel, to visit the Meissner again with him, and to go together to Göttingen; but I did not agree to this."[82]

Yet in assessing van Marum's account of events in 1795 one also has to bear in mind that the overall aim of his recollections was essentially to badmouth the trustees. As has already been pointed out this did not mean that he gave a false account of events, and all factual evidence he presents can be corroborated – but it would have been in his interest to dramatise the situation he found himself in as director of both major scientific collections in Haarlem, and then emphasise how it was he who had ensured Teylers Museum survived the political turmoil unscathed. And even if his personal acquaintance and general standing undoubtedly raised the threshold for any possible interference with his work or Teylers Museum, there was another significant and ultimately perhaps even far more important reason why Teylers Museum remained unaffected by the change in government, a reason which van Marum fails to mention in his recollections: Teylers Museum was a private collection – the Stadholder's

[79] "'s morgens vroegtijdig"; "Zij bemerkten, onder het beschouwen dezer verzamelingen, mijne vrees, dat zij sommige zeldzame voorwerpen, met te begeerlijke oogen zouden aanzien"; "Van tijd tot tijd kwam de een of ander dezer Commissarissen alhier terug, dan eens een alleen, en dan weder een of twee andere representanten mede brengende, het geen ook wel eens weder mijne vrees voor requisitien vernieuwde"; Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 59.

[80] The correspondence between van Marum and the commissioners has been preserved amongst van Marum's papers: For Faujas see: Haarlem, NHA, Archief van Marum, vol. 529, nr.16. For Thouin see: Haarlem, NHA, Archief van Marum, vol. 529, nr. 22b. For Roberjot see: Haarlem, NHA, Archief van Marum, vol. 529, nr. 20a. On the commissioners' work in the Netherlands see: Bert Sliggers and Marijke H. Besselink, eds., *Het verdwenen museum: natuurhistorische verzamelingen 1750-1850* (Haarlem: Teylers Museum, 2002), 37–39.

[81] Roberjot to van Marum, 02.03.1795, Haarlem, NHA, Archief van Marum, vol. 529, nr. 20a. The letter has been translated and published in: vol. 6 of E. Lefebvre, J.G. de Bruijn, and R.J. Forbes, eds., Martinus van Marum: Life & Work (Leyden: Noordhoff International Publishing (formerly Tjeenk Willink & Zoon, Haarlem), 1976), 300.

[82] Marum, "Journey to Kassel, Göttingen, Gotha, Erfurt, Weimar and Jena in 1798," 287.

collections in The Hague, on the other hand, were public property in the sense that they had belonged to the defeated Stadholder. In this sense, and more importantly by international convention, the collections in The Hague were legitimate booty for an occupying army, whereas Teylers Museum was off limits. What underscores this is that in the Dutch Republic the Stadholder's collections were pretty much the only collections that were transferred to Paris. All private cabinets remained untouched – with one notorious exception: the fossil collection of the Dean Godding in Maastricht.

Almost ironically, this one exception – which proved to be almost strangely traumatic for Maastricht and the Netherlands – seems to underscore van Marum's worst fears, and at the same time provides an outstanding example of the indirect impact the French occupation had on Teylers Museum.

13. One Mosasaur, two Mosasaur…

As for van Marum's fears, the point is that it was Faujas himself who was intricately involved in this somewhat dubious annexation, although he himself was not even in Maastricht yet when six French soldiers removed the fossil from the home of the Dean Godding, on whose grounds it had been discovered sometime around 1770.[83] Faujas published an extensive account of all the Maastricht fossils in 1799, and chose a somewhat dramatised depiction of the mosasaur for the frontispiece of his treatise.[84]

As for the indirect impact of the political developments on Teylers Museum, it is important to realise that the fossil specimen brought to Paris by Faujas was in fact the second of its kind to be found in the quarries around Maastricht – and the first was in the possession of Teylers Museum. As was already mentioned in the previous chapter, this was even one of the very first significant acquisitions undertaken by van Marum, when he bought it off Major Drouin in 1782. So one can see why his worries that Faujas would want to take the mosasaur from Haarlem to Paris as well might have been amplified; but what is in fact far more significant with regard to the museum's collection as a whole is the research that was performed on both these fossils in the years before and after the confiscation of the mosasaur from Maastricht, as well as by whom that research was performed. A simple list of names of the main researchers that undertook research on, and were involved in controversies surrounding, the fossils besides van Marum himself provides an indication of why van Marum was drawn to this fossil – and any interest of his was of course reflected in the museum's collections. The four

[83] F.J.M. Pieters, "Natural History Spoils in the Low Countries in 1794/95: The Looting of the Fossil Mosasaurus from Maastricht and the Removal of the Cabinet and Menagerie of Stadholder William V," in *Napoleon's Legacy: The Rise of National Museums in Europe*, Berliner Schriftenreihe Zur Museumsforschung 27 (Berlin: G+H Verlag, 2009), 59–60.
[84] Barthélemy Faujas de St. Fond, *Histoire naturelle de la Montagne de Saint-Pierre de Maestricht* (Paris: Chez H.J. Jansen, 1799).

other researchers were: Petrus Camper, Adriaan Gilles Camper, Faujas de Saint Fond, and Cuvier.

Petrus Camper and his son Adriaan Gilles performed a detailed analysis of the specimen that was eventually to end up in Paris in 1782.[85] Locals had identified it as the remains of a crocodile, but some years later, when Camper was in London, he could compare further specimens he had collected around Maastricht with crocodile bones from the Royal College of Surgeons' collection, and concluded that there were significant differences with the Maastricht animal.[86] In Camper's opinion, what had been found in Maastricht were the remains of a sperm whale. He published his findings in the Royal Society's Philosophical Transactions in 1786. Four years later van Marum followed his mentor and concluded that the fossil in the Teyler Foundation's possession also stemmed from a whale.[87] Then, in his 1799 treatise on the fossils of Maastricht, Faujas suddenly claimed that the elder Camper had changed his mind shortly before his death in 1789, and started to claim the fossil consisted of the remains of a crocodile – which happened to coincide with Faujas' own assessment. Faujas' claim now in turn caught the attention of the younger Camper, who had established an intense correspondence with Cuvier just a while before.[88] Adriaan Gilles was convinced that Faujas had obtained the wrong impression from his father, and had his unpublished papers and correspondence to prove it. This in turn was of great interest to Cuvier, who was at odds with Faujas over many things, including Faujas' notion that fossil bones did not stem from extinct species, but represented creatures that had simply not been discovered yet because they were now at home in unexplored areas of central Africa. The renewed study of the Maastricht fossil along with other specimens from the elder Camper's exquisite collection – now in his son's possession – led Adriaan Gilles to conclude in 1800 that the mosasaur was neither a whale nor a crocodile, but in fact some sort of marine lizard. This, in turn, bolstered Cuvier's – rather than Faujas' – views on extinction and the status of fossil bones because it indicated that "the Maastricht fauna contained no mammals at all and no crocodiles; it belonged more clearly than ever to a distinct former world".[89]

So how is all this relevant to van Marum's handling of the fossil collection at Teylers? First and foremost, it helps to understand why van Marum's interest in the earth sciences was reignited during the last years of the 18th century. In a nutshell, one could say that he first acquired the mosasaur in 1782 at least in part because of Petrus Camper's interest in the fossil bones of Maastricht, and then, when Cuvier practically rose to stardom with his ideas on extinction and the mosasaur itself even moved centre stage in these debates following Faujas' studies of the Maastricht fossils, van Marum's scientific curiosity would inevitably have been

[85] Pieters, "Natural History Spoils in the Low Countries in 1794/95: The Looting of the Fossil Mosasaurus from Maastricht and the Removal of the Cabinet and Menagerie of Stadholder William V," 57.
[86] Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution*, 255.
[87] Martinus van Marum, "Beschryving der beenderen van den kop van eenen visch: gevonden in den St. Pietersberg by Maastricht, en geplaatst in Teylers museum," vol. 8, Verhandelingen uitgegeven door Teyler's Tweede Genootschap (Haarlem: J. Enschedé; J. van Walré, 1790), 383–389.
[88] On this see: Bert Theunissen, "De briefwisseling tussen A. G. Camper en G. Cuvier," *Tijdschrift voor de Geschiedenis der Geneeskunde, Natuurwetenschappen, Wiskunde en Techniek* 3, no. 4 (1980): 155–177; Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution*, 381–384.
[89] Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution*, 384.

piqued, and he would have wanted in on the action. What's more all these developments would have resonated with him on many levels: he was for instance well acquainted personally with some of the key figures in these debates, such as both of the Campers (van Marum corresponded extensively with Adriaan Gilles too) and Faujas. As a result, he was privy to the latest developments – for example he provided Faujas with exquisite depictions of some fossils for his book, which were carefully crafted by Wybrand Hendriks.[90] Van Marum was also well acquainted with some of the key collections important in any discussion – such as Petrus Camper's, the former collections of the Dutch Stadhouder, and of course his own – besides the mosasaur Teylers Museum was home to many other specimens from the Maastricht region. What's more, through his own background and training van Marum was uniquely qualified to participate in the debates that were raging – he had after all completed his training at university with comparative studies, and in some sense Cuvier had picked up where van Marum's mentor had left off: alongside John Hunter in London and Buffon in Paris, Petrus Camper had been "among the most significant contributors to the debate [on fossil bones]".[91] Finally, the buzz Cuvier created coincided with van Marum's loss of interest in electricity and chemistry.

14. A Rekindled Love Affair

The most spectacular fossil van Marum subsequently purchased for Teylers Museum – one of the museum's highlights to this day – needs to be seen against the background of these discussions: when he travelled to Switzerland in 1802 in search of geological specimens, van Marum acquired the "homo diluvii testis", a fossil that had previously been acquired by the earth scientist Johann Jacob Scheuchzer after it was unearthed in Southern Germany in 1725.[92] Scheuchzer then classified this fossil as the remains of a human who had not survived the deluge. This was sensational, because by this time one of the nagging doubts about the biblical account of the catastrophic flood was that no remains of humans could be found, even though the deluge had of course purportedly been intended as a final punishment for all those sinners that didn't make it onto the Ark. Scheuchzer's fossil therefore had the potential to serve as strong evidence in favour of the biblical account.

By the time van Marum visited Switzerland, Scheuchzer had been dead for a long time and his assessment of the homo diluvii had largely been discredited – Petrus Camper had already argued persuasively that what this fossil in fact constituted were the remains of a lizard – but the fossil itself was of renewed interest in light of all the recent discussion concerning extinction. In fact it required all of van Marum's persuasive charm to buy this specimen off Scheuchzer's grandson. But back in Haarlem, all efforts proved worthwhile when it garnered

[90] Bert Sliggers, "Krijtfossielen teruggevonden," *Teylers Magazijn* 114 (2012): 12–14.
[91] Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution*, 351.
[92] On this fossil and van Marum's acquisition of it see: Bert Sliggers, *De zondvloedmens: van catastrofe naar evolutie* (Amsterdam: Nieuw Amsterdam, 2009).

renewed interest some ten years later: in 1811 Cuvier visited Haarlem on a tour through the Netherlands – he was on an assignment from the French government to assess the Low Countries' educational system – and spent some time at Teylers Museum studying the collection; van Marum permitted him to analyse the homo diluvii testis and verify the hypothesis that further excavation of the fossil would reveal the creature's two leg-like paws – a lighter colour still reveals where Cuvier chipped away at the stone surrounding the fossil. And indeed, two small legs were laid bare, thereby making even more plausible that these were the remains of some kind of salamander.

Other examples that reflect van Marum's interest in the issues surrounding fossil bones and extinction from this period abound. On his journey to Germany in 1798 for instance he was presented with one of the "Lying Stones" the unfortunate Professor Beringer had been coaxed into believing were real fossils about seventy years earlier – having collected hundreds of such "fossils" purportedly from a specific region over many years and even having published scientific treatises on his "findings", Beringer only realised he had become the victim of an elaborate prank when he was presented with a fossil that had his own name written on it.[93] Van Marum's successor van Breda later purchased more of these Lying Stones. Another example is provided by a letter van Marum sent to J.R. Coxe of the American Philosophical Society in Philadelphia in 1802. He was writing in his function as secretary of the Holland Society, but the letter is also a good example of how, on occasion, van Marum was able to capitalise on this to the benefit of Teylers Museum. Having exchanged periodicals with the American Philosophical Society, van Marum now added: "Comme je suis le directeur d'une collection très étendue des minéraux et des pétrifications, et des parties animales fossiles » - by which he of course meant Teylers – "qui est ce qui m'intéresse beaucoup d'acquérir quelques ossements du mammouth, ou de l'animal qui se trouve près de l'Ohio."[94] The "Ohio animal", a mastodon then still thought to be a mammoth, had been found in the North American region it was named after, and had been one of the most contested fossils before Cuvier presented his theories.

But even though van Marum's interest in the earth sciences evidently increased around the turn of the century, it would be wrong to assume he was not interested in them before. The opposite was in fact the case, as his early acquisition of the mosasaur and the publication of his analysis thereof in 1790 already suggest. It is only that this area of research had been eclipsed by electricity and chemistry before. It is equally important to recall that initially van Marum had actually been appointed by the Foundation to take care of the growing fossil collection and to keep it accessible to interested third parties – and that the trustees had only reluctantly agreed to his establishing an instrument collection alongside the fossil collection. Van Marum had, in fact, continued to purchase geological specimens such as minerals and rocks throughout the 1780s.

[93] See for example: Ibid., 8.
[94] M. van Marum to J.R. Coxe, 18.04.1803, Philadelphia, APS, Archives, Record Group IIa.

15. A Matter of Faith

This brings us to the second main point that was mentioned above as important to keep in mind when trying to understand the history and overall status of Teylers Museum's geological collection: that van Marum was a deeply religious person. More to the point, it was his physico-theological approach to nature that shows more strongly in this area of collecting and research than in any other. Time and time again he emphasised how he believed that a systematic analysis of the earth and its properties would lead to a better understanding of God's work. What's more, the idea was to pass on any insights gained in this way. During a lecture on the earth sciences he gave before the trustees in 1798 van Marum himself summarised what he saw as "the aim [...] for which this collection had been made at this Foundation: namely, to give every philosophical observer the opportunity to enlarge his insight into the works of the Creation."[95]

Admittedly this remark was made within the context of a lecture on extinction, i.e. van Marum's newest interest at the time, and other passages from the lecture clearly reflect the impact Cuvier's ideas had had on van Marum's view of the earth sciences – but, far more crucially, van Marum's physico-theological approach to nature is already abundantly clear in his inaugural lecture as town lecturer which he gave in 1777, and his strong belief had certainly not waned by 1810 when he published his *Catalogue des Plantes* and quoted Priestley saying "A life spent in the contemplation of the productions of Divine power, wisdom, and goodness, would be a life of devotion".[96] One can safely assume that the sentiments expressed in 1798 had indeed guided van Marum all along, and also that they continued to do so.

There can be no doubt that these sentiments would have resonated well with the trustees, all the more so because this chimed with the tenets set out by Pieter Teyler in his will. With this in mind it is perhaps easier to understand why van Marum was able to acquire items for the geological collection even during the period in which no money was available for the expansion of the instrument collection in the 1780s – although money was tight here too, and van Marum was initially told that he could not expand the geological collection any further.[97] It was only because van Marum argued that it would look strange and possibly tarnish the Foundation's reputation if he suddenly ceased acquiring geological specimens at auctions after hitherto having spent large amounts of money in the Foundation's name, that the trustees provided him with the resources that had become available from the sale of some of Pieter Teyler's books.[98] And even after that they don't appear to have cut his budget for acquisitions to zero, because a journal van Marum kept of his acquisitions lists numerous and regular

[95] "het oogmerk [...] waar toe deeze verzameling bij deeze Stichting is aangelegd: om namelijk, aan elken wijsgeerigen beschouwer, geleegenheid te geeven zijne inzichten in de werken der Schepping uit te breiden." "Geologische Leszen bij Teylers Stichting 1798-1803", 02.11.1798, Haarlem, NHA, Archief van Marum, vol. 529, nr. 6.
[96] Marum, *Catalogue des plantes, cultivées au printems 1810; dans le Jardin de M. van Marum à Harlem*, viii.
[97] "Directienotulen", 29.04.1785, Haarlem, ATS, vol. 5. (cf. footnote 25.)
[98] Martinus van Marum: "Journal van mijne verrichtingen ter verkrijging eener verzameling van Fossilia in Teyler's Museum", 1782-1790, Haarlem, NHA, vol. 529, Archief van Marum, nr. 11d, 15.04.1785.

smaller purchases over the course of the following years.[99] Most of these were made through mineral dealers, chiefly through one Mr. Voight from Amsterdam. It was Voight, too, to whom van Marum turned as soon as it became clear that the museum's budget had been increased significantly in 1788, instructing him to acquire whatever he considered suitable for Teylers Museum on a journey to Hanover.[100] Van Marum did so with van Zeebergh's full support. The trustee had even explicitly stated that van Marum "could make it clear to the said Voight, that if he bought something of only minor interest for Teylers Museum, we [the Teyler Foundation and van Marum] would not leave him saddled with it."[101] The trustees' support became equally clear when they explicitly allowed van Marum to spend more than f2000,- on geological specimens without prior consultation on his trip to London in 1790.[102]

So if one takes the entire period of van Marum's tenure into account it becomes clear that fossils – in the modern, narrow sense of the word – were just one aspect of van Marum's collecting activities, albeit the one that received the most attention and subsequently gained far more prominence for the simple reason that van Marum's successors focussed almost exclusively on fossil bones, rather than what would today be classified as minerals and rocks. This had everything to do with the major changes in the earth sciences that were mentioned above, and particularly the emergence of what is today denoted as palaeontology as an area of research in its own right.

With an eye to understanding the genesis of the scientific collections at Teylers Museum and what was ultimately put – and remained – on display in the Oval Room, it can however hardly be stressed enough that van Marum had a far more generalistic approach to the earth sciences than any of his successors. In fact, even by contemporary standards his activities covered pretty much all the subfields of the earth sciences.[103] Van Marum was not, for instance, a mineralogist in the traditional sense, who restricted his studies to the description, classification, and analysis of specimens brought to him at the museum by others. Although this clearly constituted a major part of van Marum's work, he was just as clearly a believer in the value of field studies. During his trip to Switzerland in 1802 for instance he went on excursions to the Alps, and had himself rowed out onto a lake in order to be able to make sketches of the mountain formations surrounding him from a greater distance, in the hope of gaining a better understanding of their overall structure. In doing so, he revealed his fascination not just for the surface structure of the earth (following Martin Rudwick its study could be termed physical geography), but also for what was hidden below the surface (geognosy, in Rudwick's terms). This had only recently begun to interest scholars, before the end of the 18th century it had been the reserve of mining engineers.

[99] For this see: Martinus van Marum: "Journal van mijne verrichtingen ter verkrijging eener verzameling van Fossilia in Teyler's Museum", 1782-1790, Haarlem, NHA, vol. 529, Archief van Marum, nr. 11d.
[100] Ibid., 21.11.1788.
[101] "gemelden Voight konde te verstaan geeven, dat indien hij het een en ander van minder belang voor Teylers Museum aankocht, wij er hem niet meede zouden laaten zitten [last word unreadable: rusten?]." Ibid.
[102] "Directienotulen", 18.06.1790, Haarlem, ATS, vol. 5.
[103] I am following Rudwick in his distinction here: Mineralogy, physical geography & geognosy. See: Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution*, 59–132.

His belief in the importance of field studies is also reflected in his fascination with Horace-Bénédicte de Saussure, who became the first to mount a scientific expedition to the top of Mont Blanc in 1787. In 1799 van Marum not only purchased a large plaster model of the Mont Blanc on which a dotted line marked de Saussure and his companions' passage, but some ears later he also bought a rock that Horace-Bénédicte himself had claimed to have chipped off the very top of the French mountain.[104]

15. Gee, but You're Pretty

So, as a result of van Marum's broad definition of the earth sciences and his profound interest in a range of issues connected with them, as well as the fact that pursuing these interests was encouraged by the trustees, the museum's collections include – in modern terms – a palaeontological as well as a mineralogical collection, the latter of which was not significantly expanded after van Marum's tenure.

This of course is relevant in itself to the history of Teylers Museum, but it is particularly interesting and important with regard to the changing function of the Oval Room. This is all the more the case because the geological collection's heyday – during van Marum's tenure – coincides with the addition of laboratory premises and with the receding importance of the electrostatic generator, which, as was mentioned above, in themselves already brought about changes in the usage of the Oval Room.

More to the point, two facets of the work with geological specimens come to the fore here: firstly, any systematic classification of geological specimens requires a comparison with other specimens. On the one hand this requires that other specimens are available for such a comparison, i.e. the size and scope of a collection as a whole becomes relevant; but at the same time any such comparison is greatly facilitated if the collection as a whole is visually easily accessible, i.e. if the specimens can be spread out, or already are spread out. Secondly, many of these specimens are pleasing to the eye – precious stones are not called "precious" without reason. Cherished for their aesthetic qualities, throughout the ages gems have always been incorporated into various forms of decorative art. Minerals, and to a certain extent even fossils, can therefore be seen as intermediate between "Art" and "Science", to use these anachronistic terms.

Examples, showing that both van Marum and the trustees were well aware of the geological specimens' aesthetic qualities, abound. It has already been mentioned how van Marum

[104] *Hoogtepunten uit Teylers Museum: Geschiedenis, Collecties en Gebouwen* (Haarlem: Teylers Museum, 1996), 66. Recent study has shown that this rock specimen (referred to as the *topje van de Mont Blanc*) indeed stems from the highest region of the mountain (Personal communication with Bert Sliggers, Teylers Museum). But at the same time, de Saussure presented a member of the APS with "a specimen of rock from the highest pinnacle of Mont Blanc" too. On this see: *Proceedings of the American Philosophical Society*, vol. 2, 16, 1841, 101.

consulted with the architect Leendert Viervant to have special showcases for the most striking minerals incorporated into the flat-top cabinet at the centre of the Oval Room.

Another example is provided by the way the total sum van Marum was provided with for geological specimens in London in 1790 was broken down: out of the total amount of f2300,-, f300,- were earmarked "to be spent on the purchase of Fossils still missing in the Systematic Arrangement of the Fossils presently made in the Musaeum", and the remaining f2000,- was earmarked "to be spent on some outstandingly beautiful Pieces which would be an adornment of the Collection of Fossils".[105]

Similarly, in 1798 van Marum chose to arrange all the samples of fluorspar from England and Saxony in the collection in two pyramid-shaped showcases.[106] Although the design of the showcases was by no means unusual during this period, their shape apparently did not serve any scientific function.[107]

Almost ironically, minerals' aesthetic qualities could also prove to be a hindrance to their systematic study. In 1802 van Marum for instance explained to the trustees why he had to travel to Switzerland personally in pursuit of a certain class of minerals he needed:

"The minerals and the pieces which are most instructive in this respect, are mostly less pleasing to the eye of superficial observers. They are therefore not supplied by the Dealers in minerals, and they can therefore only be obtained by ordering from the places where they are to be found."[108]

Finally, perhaps the single most important decision of van Marum's concerning the mineral collection's display in the Oval Room was made in the aftermath of his journey to Switzerland: in order to allow for an adequate arrangement of the entire mineral collection, he had showcases constructed that covered the flat-top cabinet at the centre of the room.[109] As a result, the emphasis in the Oval Room shifted towards the visual, and away from the experimental. Put simply, this meant people now came to the Oval Room to "look at things", whereas if they wanted to handle an instrument or perform an experiment they would have gone to the adjacent laboratory.

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[105] "te besteeden tot aankoop van Fossilia nog ontbreekende aan de Systhematische Schikkinge der Fossilia thans in het Musaeum gemaakt"; "te besteden aan eenige uitmuntend schooner Stukken welke tot cieraad der Verzamelinge van Fossilia konnen strekken"; "Directienotulen", 18.06.1790, Haarlem, ATS, vol. 5.

[106] W. Nieuwenkamp, "The Geological Sciences," vol. 3, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1971), 210.

[107] Similar showcases can be seen on depictions of other 18th century cabinets. See for example the depiction of Johann Christoph Richter's Museum in Leipzig, made in 1743 for Johannes Ernst Hebenstreit's *Museum Richterianum*, reproduced in: Friedrich Klemm, *Geschichte der naturwissenschaftlichen und technischen Museen*, vol. 2, Deutsches Museum: Abhandlungen und Berichte 41 (München: Oldenbourg Verlag, 1973), 37.

[108] "De delfstoffen en stukken die ten deeze opzichte het leerzaamste zijn, zijn grootdeels minder behaaglijk voor het oog van oppervlakkige beschouwers. Zij worden deswegens door de Handelaars in delfstoffen niet aangebracht, en zijn dus niet te bekomen, dan door ze te ontbreden [unreadable: ontbieden?] van de plaatsen waar zij gevonden worden." "Geologische Leszen bij Teylers Stichting 1798-1803", 14.11.1800, Haarlem, NHA, Archief van Marum, vol. 529, nr. 6.

[109] Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 94-95.

This is of course a slight oversimplification: the items from the geological collections were still "handled". In fact, handling them was necessary if they were to be analysed or compared. What's more, the primary purpose of the collection and its arrangement was scientific research. Nevertheless, they now had their fixed places in showcases, and the installation of these showcases also meant that the only flat surface in the Oval Room – a prerequisite for any serious experimenting – had disappeared.[110]

At the same time, van Marum was voicing his intentions of making the geological collections more widely accessible. In his introductory remarks to a lecture before the trustees in November 1802, he stated that he wanted to tell them more about

"what is being collected by me for this Foundation, in order that these collections, which, as they increase in perfection, I will try to open to general inspection more and more, may serve all the more to give superficial spectators the opportunity to extend their insights into the works of the Creation."[111]

He reiterated these intentions some months later, in March 1803, saying that his aim was "to expose [the specimens] more and more to inspection and to provide them with proper labels", so that they could help demonstrate the beauty of Nature to "the Members of this Foundation and further to anybody who asks admittance.[112]

17. No Happy End

Early in 1803, however, van Marum had a huge row with van Zeebergh. Only van Marum's account of the disagreement has been preserved. He describes it as originating from an "unexpected change" of Zeebergh's "way of thinking". More specifically, the trustee declined to provide more funds for the expansion of the geological collection in the aftermath of van Marum's journey to Switzerland. This shattered van Marum's plans for the future and put him in an awkward position, as he had just devised plans for a final major expansion of the collections to complete them, and appears to have announced to Werner in Freiburg that he was going to purchase a large amount of items from the famous geologist's collection – prematurely, as it now turned out. Van Marum describes how he desperately tried to change

[110] Julia Noordegraaf has previously pointed out that the installation of these showcases constituted a watershed in the history of Teylers Museum. However, she does not pay heed to the mineral collection's scientific function in her assessment. Julia Noordegraaf, *Strategies of Display: Museum Presentation in Nineteenth- and Twentieth-century Visual Culture* (Rotterdam: NAi Publishers, 2004), 9–10.

[111] "het geen door mij bij deeze Stichting verzameld wordt, ten einde deeze verzamelingen, die ik meer en meer, naarmaate zij in volkomenheid toeneemen zal, ter algemeene beschouwing tracht opentestellen des te meer dienen mogen om om aan [unredable short word: men?] oppervlakkige beschouwers geleegenheid te geeven hunne inzichten in de werken der Schepping uittebreiden." "Geologische Leszen bij Teylers Stichting", 19.11.1802, Haarlem, NHA, Archief van Marum, vol. 529, nr. 6.

[112] "[de stukken] meer en meer ter beschouwing bloot te stellen, en van behoorlijke bijschriften te voorzien"; "de Leeden deezer Stichting en wijders een iegelijk die hier voor den toegang vraagt". "Geologische Leszen bij Teylers Stichting", 25.03.1803, Haarlem, NHA, Archief van Marum, vol. 529, nr. 6.

van Zeebergh's mind, but to no avail. On the contrary, relations subsequently seem to have hit rock bottom, and van Marum quotes van Zeebergh as crying out "that if he had been able to surmise that my plan had been to elevate the collections of Minerals in Teylers Museum to such a (as he most improperly called it) colossal height, he should never have given his permission to bring it together."[113]

Whatever way van Zeebergh might have told the story, the fact remains that van Marum thereafter reduced his activities at Teylers Museum to a minimum – although he did remain its director for many more years, until his death in 1837.

It is interesting to note that van Marum never severed his ties with the museum. Even after 1803 he continued to welcome important visitors for instance, such as the Emperor Napoleon in 1811; he still oversaw the occasional acquisition for the museum's collections; and above all he continued to purchase books for the library – its premises were even expanded and it was made more easily accessible to the general public in 1825.

Nevertheless van Marum's main focus now was on botanical studies. To this end, he had acquired a house with grounds which he christened "Plantlust" just outside the gates of Haarlem, and began cultivating the plants he catalogued in 1810. As usual, he was not one to do things by halves, and in this area too he corresponded with elite botanists from all over the world, many of which – such as Joseph Banks – he had become acquainted with during his previous travels. In 1816 he had an orangery built on his premises, and in 1817 a hot-house.[114] At the same time, van Marum was still the secretary of the Holland Society as well, and as such became heavily involved in science policy at a national level, particularly during the Napoleonic period and the establishment of the Dutch monarchy during the Restoration.

Even the politics however only had an indirect impact on the daily running of Teylers Museum, certainly in the short term. What was far more important at this stage was van Marum's relative inactivity, which in turn meant that the collections he had built entered a kind of "sleeping beauty" phase – they remained virtually unchanged for decades. And at the same time, van Marum's absence gave the *kastelein* more room to implement his own ideas for the collection. This became all the more relevant when Wybrand Hendriks retired in 1819. He was replaced by Gerrit Jan Michaëlis, who took the fateful decision of purchasing paintings – not just prints and drawings – for the museum. This paved the way for it to gradually take the shape of a modern, public art museum.

Meanwhile, van Marum's interest in botanical studies fit perfectly into his general approach to the study of nature – to which we shall now turn.

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[113] "onverwachte verandering van denkwijze"; "dat indien hij had kunnen vermoeden dat mijn plan zoude geweest zijn de verzamelingen van Delfstoffen, in Teijlers Museum tot zulk eene (zoals hij het zeer ongepast noemde) colossal hoogte te verheffen hij nimmer tot derzelver aanleg, zijne toestemming zoude gegeven hebben." Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 99-100.

[114] For botanical activities see: M.J. van Steenis Kruseman, "Botany and Gardening," vol. 3, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1971), 127–174; Andreas Weber, *Hybrid Ambitions: Science, Governance, and Empire in the Career of Caspar G.C. Reinwardt (1773-1854)* (Leiden: Leiden University Press, 2012), 98–100.

II Van Marum's "Philosophy of Science"

1. He Kant be Serious

Van Marum, it seems, had little good to say about Immanuel Kant's philosophy. So much at least can be inferred from the transcription of a public lecture on mechanics van Marum gave to a lay audience, in all likelihood consisting of more than 100 listeners, in 1796. As was his habit, van Marum wrote out these lectures in their entirety. One can almost picture him preparing this particular lecture, leafing through his German copy of Kant's "Metaphysical Foundations of Natural Science" which had been published some ten years earlier, and feeling utterly stumped. Referring to one particular claim about attractive and repellent forces, van Marum jotted down:

"It is utterly incomprehensible to me how a proposition that is so obviously in contradiction to what common sense so clearly teaches, can have found any advocates."[115]

This, he then evidently decided, was perhaps a little too harshly worded, because he subsequently struck out this passage. But the words that followed, although slightly more diplomatic, were no less scathing, as he pondered:

"Whether Kant with all his cleverness really convinced himself by his ratiocinations of the truth of this Proposition, has often seemed very doubtful to me."

In other words, he considered all he read so incredulous that he doubted Kant himself actually believed what he had written.

Van Marum's statements are interesting for a number of reasons. Firstly, the fact that van Marum devoted a considerable portion of his lecture to discussing – and deriding – this new philosophy goes to show that Kant's ideas were hotly debated in the Netherlands too, even just a few years after their initial publication. Secondly, it might be reassuring to scholars through the ages that Kant's publications were considered both equally complex and puzzling in their own time as they are by almost all subsequent students of Kant. Finally and most importantly however, this episode reveals a lot about van Marum's own views on knowledge, and how one should approach the study of nature. More to the point, van Marum's rejection of Kant's arguments is not surprising if one realises that throughout his life, van Marum was a strict adherent to the principles of empiricism, in the sense that he rejected any form of speculation or any extensive body of theory that was not spawned by experimentation and observation. In his eyes, even the mathematical formulation of theories could be more of a hindrance than an aid. As he explained in his introductory remarks to another series of lectures on physics which he gave before a different audience in 1779:

[115] "Het is mij ten eenemaal onbegrijpelijk hoe eene stelling zo blijkbaar aanloopende tegens het geen het gezond verstand zo duidelijke leert, nog eenige verdedigers kan gevonden hebben."; below: "Of de schrandere Kant door zijne redeneering zich zelven waarlijk van deeze Stelling kan overtuigd hebben, is mij meermaalen zeer twijfelachtig voorgekomen." "Openbare lessen in 1795 & 1796", 12.12.1800, Haarlem, NHA, Archief van Marum, vol. 529, nr. 12.

"In developing these sciences I shall not follow the example of those who, in order to seem learned, count a large number of ground rules, prove these, however simple they may be, with great display of mathematics and in this way fill entire volumes with so-called fundamental principles. I think such an approach is most suited to keep science to itself, and to scare others away from its study."[116]

Although van Marum was probably speaking to a lay audience here, he doesn't appear to have been trying to pander to his listeners with this statement, and neither does he appear to have changed his opinion on mathematics over the course of the next decades: some years later, he refused a professorship in Utrecht, one of the reasons being that the teaching obligations involved too much mathematics; and none of his publications contain any elaborate mathematical reasoning.

Clearly, if van Marum already considered mathematics too much of a hindrance to a clear understanding of the workings of nature, Kant's loftily worded theories must have been anathema to this die-hard experimentalist.

Van Marum's belief in the values of empiricism and observation is in fact just one of three major facets of van Marum's overall approach to the study of nature, although of the three it is perhaps the most important, because this, above all, informed his methodological approach to research. The other two bore more relevance to his underlying motivation, i.e. what inspired him and gave him the energy to carry out his research activities. More to the point, the two other facets are, firstly, his strong religious beliefs – which are reflected in his physico-theological approach to nature – and, secondly, a clear utilitarian streak in his character. All of these, however, are of course connected, and each one of them will be addressed in a little more detail in the following.

2. You Better Believe It

As for his physico-theological approach to nature, this is perhaps the most surprising to modern ears. However, it is important to understand that the apparent opposition and mutual exclusivity of "science" and "religion" is largely a late 19th century construction, a myth that was born out of the necessity to forge the identity of the nascent scientific community as much as it was brought forth by the opposition to any form of genuine attempt at suppressing

[116] "In 't ontvouwen van deze wetenschappen zal ik niet volgen het voorbeeld van hun, die, om geleerd te schijnen, een grot aantal van grondregels tellen, dezelven, hoe eenvoudig zij ook zijn mogen, met veel toestel van wiskunde bewijzen en op deze wijze gehele boekdelen met zogenaamde grondbeginselen vullen. Deze handelwijze oordeel ik de geschikste om de wetenschap voor zich zelve te behouden, en anderen van derzelver beoeffening afteschrikken." "20 Lectiones Hydrostaticae, Hydraulicae, Aerostaticae ut et de proprietatibus Aeris, Aquae & Vaporis aquei, 1779, 1780", 10.11.1779, Haarlem, NHA, Archief van Marum, vol. 529, nr. 13.

the analytical sciences by theologians or "the Church".[117] The rapid acceptance of what has been termed the "Draper-White thesis" subsequently eclipsed any attempts at a more nuanced assessment of the interrelation between theology and the study of nature. Yet the Netherlands are a prime example of how, until almost the end of the 19th century, many scientists' strongly held religious beliefs informed their scientific studies.

This was certainly the case with van Marum. In fact, his belief suffuses all his areas of research. Time and time again he emphasised how he believed a better understanding of the workings of nature would incontrovertibly lead to a greater appreciation of God's creation, and therefore, by proxy, the Creator himself as well. What's more, throughout his life – certainly throughout his most active period at Teylers Museum – he appears to have been unwavering in his belief.

In his very first public lecture, his inaugural as town lecturer in 1777, van Marum already hammered this point home. Only a few pages into the published transcription for instance he professed:

"My aim is to show to you the suitableness of Physics [*Natuurkunde*] to evoke in us a reverence for the infinite omnipotence and wisdom of the GREAT CREATOR, as its first usefulness."[118]

He reiterated these sentiments at various other points during his lecture. Halfway through his presentation for instance he said:

"Numbers and words fail us to express the vastness of the works of the GREAT CREATOR. [...] Therefore you see, most eminent and most honoured Listeners! that even a superficial contemplation of the works of the GREAT MAKER, convinces us emphatically of HIS infinite omnipotence."[119]

It did not matter whether he was speaking of his electrical researches, chemistry, or the earth sciences either. In van Marum's opinion, all of them helped reveal the Creator's absolute superiority. In 1797, explaining items from the geological collection to the trustees for instance, van Marum stated that he didn't just want to show them the specimens, but that it was also his aim

[117] David C. Lindberg and Ronald L. Numbers, "Introduction," in *God & Nature: Historical Essays on the Encounter Between Christianity and Science*, ed. David C. Lindberg and Ronald L. Numbers (Berkeley; Los Angeles; London: University of California Press, 1986), 1–18.
[118] "Myn oogmerk is, UL. de gepastheid der Natuurkunde, om ons tot eerbieding des GROOTEN SCHEPPERS oneindige Almacht en Wysheid optewekken, als derzelver eerste nuttigheid, voor te stellen." Martinus van Marum, *Intree-rede over het nut der natuurkunde in 't algemeen, en voor de geneeskonst in 't byzonder* (Haarlem: J. Bosch, 1777), 6.
[119] "Getalen en woorden ontbreken ons, om de wyduitgestrektheid der werken des GROTEN SCHEPPERS uit te drukken. [...] Dus ziet gy, zeer aanzienlyke en zeer geëerde Toehoorders ! dat zelfs ene maar oppervlakkige beschouwing van de werken des GROTEN MAKERS, ons van ZYNE oneinige almacht op 't nadrukkelykst overtuigt." Ibid., 14.

"to bring to your attention, what essential knowledge can be derived here by philosophical observers, and what additional insights into the very early works of the creation they may occasion in us."[120]

Tellingly, van Marum did not restrict such statements to situations in which he might have felt obliged to make them in order to pacify his audience. As was described in the previous section, van Marum for instance gave a series of lectures before a larger audience after the French Revolutionary Armies had conquered the Dutch Republic. Although he emphasised the utilitarian aspects of his research and science in general in these lectures, he did not omit frequent references to the Creator. (Although, interestingly, they became ever more frequent as the years progressed and French influence began to wane.) During his second lecture for instance, after having demonstrated an experiment concerning the properties of air, he stated:

"You [unreadable] see therefore from this first example (and you will many times be able to observe the same in the following lessons), You see therefore, I say, from this first example of the limitation of our mind that the study of Physics [*Natuurkunde*] is particularly suited to induce man to form humble [unreadable] conceptions of his intellectual powers, and thus to guard him from priding himself overmuch in his cleverness or his deep insight into the true nature of things."[121]

And while this could still be construed as a general appeal to be humble in view of nature's complexity, just a few sentences later van Marum left no doubt as to whom he thought was behind this complexity:

"The Creator has endowed Man with such intellectual powers, to be able to understand the Nature of things to such an extent as can be useful for the satisfaction of his needs and the augmentation of his pleasures in the present life."

Although he was then quick to emphasise how the study of nature could lead to practical applications, perhaps also in view of the French occupiers' penchant for utilitarianism:

"Let us therefore continue to devote part of our time to this science, and in particular to the most useful and the most applicable parts of it."

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[120] "UE onder het oog te brengen, welke wezentlijke kennis hier uit voor wijsgeerige beschouwers te verkrijgen is, en tot welke verdere inzichten in de zeer vroege werken der schepping, zij ons aan leiding geeven kunnen." "Geologische Leszen bij Teylers Stichting 1798-1803", 22.03.1799, Haarlem, NHA, Archief van Marum, vol. 529, nr. 6, fol. 39.

[121] "GijE [unreadable] ziet dus uit dit eerste voorbeeld (en dergelijken zult Gij in 't vervolg van deeze lessen veelmaalen kunnen op merken) GijE ziet dus zeg ik, uit dat eerste voorbeeld der beperktheid van ons vernuft dat de beoeffening der Natuurkunde eigenaardig geschikt is om den mensch zich van zijne verstandlijke vermogens nedrige [unreadable] begrippen te dien vormen, en hem dus te behoeden van zich niet al te veel op zijne schranderheid of diep doorzicht in den waaren aart der dingen te laaten voorstaan."; below: "De Schepper heeft den Mensch wel zo veel verstandlijke vermogens ingelegd, om de Natuur der dingen in zo verre te kunnen inzien, als ter vervulling zijner behoeftens, en ter vermeerdering zijner genoegens in dit tegenwoordige leven kan nuttig zijn."; "Laat ons dan voortgaan een gedeelte van onzen tijd aan deeze wetenschap, en bijzonderlijk aan de nuttigste en meest toepasselijke deelen van dezelve te besteeden." "Openbare lessen in 1795 & 1796", 11.11.1795, Haarlem, NHA, Archief van Marum, vol. 529, nr. 12.

Similarly, van Marum would not have had to quote Priestley in the closing remarks of his short autobiography, which he published as the introduction to the catalogue of his plants in 1810. In addition to what was already quoted in the previous section, van Marum adopted the following words by the English chemist:

"The more we see of the wonderful structure of the world, and of the laws of Nature, the more clearly do we comprehend their admirable uses to make all the percipient creation happy: a sentiment, which cannot but fill the heart with unbounded love, gratitude, and joy."[122]

In fact the only indication that at some point during his life van Marum might have had second thoughts about his Christian beliefs can be found in the diary of a fellow member of the Second Society and prominent resident of Haarlem, Adriaan van der Willigen. Writing after the death of van Marum, he summarised: "The deceased was actually a sceptic, as he showed many times, but he tried to convince himself of the main tenets of Christianity."[123] It is of course conceivable that van Marum grew ever more sceptical as he grew older, but at the same time van der Willigen emerges from his diaries as an opinionated man, whose statements naturally have a very personal ring to them, and therefore occasionally need to be taken with a pinch of salt.

3. What You See is What You Get

What makes van Marum's professions of faith even more plausible is the fact that a physico-theological stance chimed well with his empiricism. The point is that at heart van Marum appears to have been an 18th century natural historian in the sense that his approach to the study of nature was a predominantly descriptive and classificatory one, and did not include any kind of search for a final cause of the patterns and laws governing the natural world – on the contrary, he would have put this off as "speculation". Put differently, van Marum's empiricism manifested itself in two ways: firstly, he believed in the value of observation and experiments as the basis for any claim about the workings of nature, and secondly, he deplored any form of speculative theorising.

It should be emphasised that van Marum was not alone in adopting such views. In fact he fits in well with a typically Dutch tradition of focusing on empirical data and adopting a sceptical stance towards all forms of speculative theorising, which had already been propagated by

[122] Marum, *Catalogue des plantes, cultivées au printems 1810; dans le Jardin de M. van Marum à Harlem*, viii.
[123] "De overledene was eigenlijk een scepticus, zooals hij meermalen deed blijken, maar poogde zich van de voornaamste stellingen des christendoms te overtuigen." As quoted in: Bert Sliggers, "De kwalen van Van Marum: uit het dagboek van Adriaan van der Willigen (1831-1839)," *Teylers Magazijn* 33 (1991): 10. The statement is taken not from the published diary of van der Willigen's, but from some separate, personal remarks and reminiscences on the Second Society which he had penned, and which were published in the aforementioned article.

scholars such as ‘s Gravesande, Musschenbroek, or van Marum’s contemporary Jan Hendrik van Swinden.

As for the first point, the clearest statements on this matter stem from the early phase of his career, and in them he emphasises the importance of experiments. From what amounts to a summary of his view of the history of science which he gave during a lecture in July 1777, it clearly transpires how van Marum situated his activities within the tradition of what later came to be labelled as the “Scientific Revolution”.[124] He granted that “entirely correctly [...] the ancient Greeks [may] be viewed as the true founding fathers of several sciences”, yet he lamented that all their theories were no more than mere assumptions, adding: “testing them with special experiments, was not the fashion of that time”. He then pointed out how Aristotle’s “propositions” had above all been indisputable, but only “until finally in the preceding Century Man began to question Nature with the help of experiments.” According to van Marum, this was a watershed. He describes the impact thus (in a handwritten note that is partially indecipherable, but the gist of which is readily understandable):

“Erelong it was seen that the Propositions of the Scholastic Philosophers, which had been taught so long and had been so much extolled, were pure fabrications; and discoveries were made that shed much light on many phenomena and that were of great importance for society. And at the same time people became convinced that the only way to discover things in Physics [*Natuurkunde*] was to perform Experiments.”[125]

In other words, real progress had only become possible once Artistotle’s system of knowledge was overturned and scholars came to rely on experimental research. There is no doubt either as to whom van Marum identified as the heroes in this story: in other lectures he speaks of “The great Newton”, and “the sagacious Italian Philosopher Galileo”.[126]

Van Marum also left no doubt as to the limitations of this experimental approach, which brings us to the second point, his opposition to extensive theorising. In an early lecture on the compressibility of gases and liquids – in which he had alluded to “the great Newton” as well – he concluded in the following manner:

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[124] For a historiographical approach to this term see: Marcus Hellyer, ed., *The Scientific Revolution: The Essential Readings* (Malden: Blackwell, 2003).

[125] “[m]et het grootste regt [...] de oude Grieken voor de waare grondleggers van verscheidene wetenschappen gehouden worden [mogen]”; “dezelve door opzettelijke Proefneemingen te toetsen, was de smaak van die tijd niet”; “[t]ot dat men eindelijk in de voorgaande Eeuw begonnen is de Natuur door Proeven raadteplegen.”; “Wel haast zag men, dat de zolang geleerde, en zo zeer opgebierde [unreadable] Stellingen der Scholastike Wijsgeren loutere verdichtselen waren; en men deed ontdekkingen, die zeer veel lichts omtrent verscheidene verschijnselen geven, en voor de zamenleving van veel belang waren. En men wierd te gelijk overtuigd, dat de enighe [unreadable word: manier?] om in de Natuurkunde te leren kunnen [precise sequence of words unclear] was Proefneemingen in het werk te stellen.” “12 Lectiones publicae, varii argumenti, 1777, 78, 79, 80”, 21.07.1777, Haarlem, NHA, Archief van Marum, vol. 529, nr. 13.

[126] “De groote Newton”; “[d]e scherpzinnige Italiaansche Wijsgeer Galilaeus”. For statements on Newton see: “20 Lectiones: de proprietatibus corporum, de legibus motus, et de machinis simplicibus, 1778, 79”, 25.11.1778, Haarlem, NHA, Archief van Marum, vol. 529, nr. 13; Ibid., 09.12.1778; “20 Lectiones Hydrostaticae, Hydraulicae, Aerostaticae ut et de proprietatibus Aeris, Aquae & Vaporis aquei, 1779, 1780”, 17.11.1779, Haarlem, NHA, Archief van Marum, vol. 529, nr. 13. For statements on Galileo see: Ibid., 12.01.1780. Other statements of van Marum’s from which he emerges as a clear proponent of the idea of a “Scientific Revolution” abound. In 1779 for instance he gave an account of the importance of the air pump in his “eighth lesson”: Ibid., 29.10.1779.

"You see how far the compressibility of the invisible elastic fluids, of airs (I mean), extends. To want to explain this and to want to derive this, like others, from certain shapes of their particles seems reckless to me, as these particles themselves are entirely outside the reach of our senses. We have to confess our ignorance again here – It seems that Man is not allowed to know the causes of the general properties of bodies – Let us therefore be satisfied with the knowledge of the properties themselves."[127]

So, at this point at least, he was not at all enamoured with atomistic models, for the simple matter that granular particles could not be perceived. He voiced similar sentiments many years later, in 1799, in a different context, when he spoke of competing theories to explain the formation of rocks. He concluded his lecture to the trustees by saying:

"Here we stand and we can find no ground to choose, out of so many conjectures that can be made on this matter, one conjecture over the others. Let us therefore rather recognize the limitations of our insights, and not occupy ourselves here, like other philosophers, with conjectures about matters that are entirely outside the reach of our observations – Let us now acquiesce in the knowledge we have gained about the initial formation of the Earth's Crust, in so far as it is based on incontrovertible observations and experiences. Here our knowledge is already very extensive".[128]

It is important, however, not to equate van Marum's rejection of far-reaching speculation with indifference, or with a superficial approach to nature. Perhaps, if one only took van Marum's strong adherence to natural theology and his clear warning of the restrictions of experimental science into account, one could suspect something akin to superficiality in his philosophy, in the sense that his research might have constituted little more than a detailed description of nature with the aim of underscoring its beautiful complexity. However, doing so would constitute the grave error of overlooking van Marum's utilitarian streak.

[127] "Gij ziet, hoe verre de zamenpersbaarheid der onzichtbare veerkrachtige vloeistoffen, der luchten (meen ik) zich uitstrekke. Dezelve te willen verklaren, en met anderen van zekere gedaantens hunner deeltjes te willen afleiden is, dunkt mij vermetel [unreadable: vermekel?], vermits die deeltjes zelve geheel buiten het bereik van onze zinnen zijn. Wij moeten dan hier weer onze onkunde bekennen – Het schijnt den mensch niet geoorloofd de oorzaaken van de algemeene eigenschappen der lichaamen intezien – Laaten wij ons dan met de kennis der eigenschappen zelven vergenoegen." "20 Lectiones: de proprietatibus corporum, de legibus motus, et de machinis simplicibus, 1778, 79", 25.11.1778, Haarlem, NHA, Archief van Marum, vol. 529, nr. 13.

[128] "Hier staan wij en weeten geenen grond te vinden om van zo veele gissingen die hier omtrent kunnen gemaakt worden, de eene gissing boven de andere te verkiezen. Laat ons dan hier liever de beperktheid van onze inzichten erkennen, en ons hier niet nevens andere [unreadable] wijsgeren met gissingen ophouden over zaaken die geheel buiten het bereik onzer waarneemingen geleegen zijn – Laaten wij ons nu te vreede houden met de thans verkregene kunde omtrent de eerste vorming van de Korst der Aarde, zo verre zij op onbetwistbaare waarneemingen en ondervindingen gegrond is. Wij vinden hierbij onze inzichten reeds zeer verre uitgebreid"; "Geologische Leszen bij Teylers Stichting 1798-1803", 29.11.1799, Haarlem, NHA, Archief van Marum, vol. 529, nr. 6.

4. The Practical Turn

First of all it needs to be said that, here, "utilitarianism" is understood in a fairly broad sense. It is perhaps best described as the belief that the production of knowledge is not so much an end in itself or an exercise of the mind, but rather that its purpose lies in the formation of a reservoir of strategies, principles and experiences from which to draw whenever some kind of practical problem needs to be solved. Because the application of knowledge – its "utilisation" – hinges on the availability or accessibility of such a reservoir, a key component of any utilitarian approach to science – alongside the application of knowledge itself – is the diffusion of the knowledge that has been accumulated, and particularly in such a manner that those to whom this knowledge is conveyed can apply it.

As might already have become clear from the previous description of van Marum's activities, he spent considerable time and energy both on the application of knowledge, and its diffusion. As for its application, recall that van Marum devised a number of practical appliances, such as a fire extinguisher, a ventilation system, and an improved "Papin" cooking pot. That he developed these devices in itself already underscores how van Marum was all for the application of knowledge. In all of these cases, his contrivances can be seen as having been spawned by van Marum's earlier research, too, i.e. on electricity, the quality of air, or his medical studies. To express in the terms of the analogy introduced above: he was drawing from the reservoir of knowledge he himself had created in devising these appliances, with the aim of improving people's daily lives.

And van Marum did not only let his deeds speak for themselves, he constantly stressed how much importance he attached to the use value of knowledge. Again, he already emphasised this in his inaugural lecture in Haarlem. In fact, the title of the lecture itself constituted something of a programmatic statement: "Introductory lecture on the use of the study of nature [*natuurkunde*] in general, and of medicine in particular". Bearing in mind that at this point van Marum was still a registered and practising doctor, it becomes clear how important "the use of the study of nature" was to him. And although he identifies a better appreciation of the Creator as one of the benefits of the natural sciences, in van Marum's view that did not preclude further, practical benefits. As he phrased it:

"When we fix our attention on the useful applications which the pursuit of the Study of Nature offers in society, [we see that] it towers above many other sciences in this respect as well."[129]

And, just as with his Christian beliefs, he was no less convinced of the potential benefits the study of nature held for society as a whole in later years. In a series of lectures for the trustees on chemistry, which commenced in 1794 for instance, van Marum explained that he had first turned to chemistry because of

[129] "Intree-rede over het nut der natuurkunde in 't algemeen, en voor de geneeskonst in 't byzonder"; "Vestigen wy onze aandacht op de nuttigheden, welke de beöeffening der Natuurkunde in de samenleving aanbiedt, niet minder verheft zy zich in dit opzicht boven vele andere wetenschappen." Marum, *Intree-rede over het nut der natuurkunde in 't algemeen, en voor de geneeskonst in 't byzonder*, 19–20.

"the extensive insight it gives us into the works of the Creator and the benefits it has provided in society, and seems to promise in future".[130]

As has repeatedly been indicated before, once the French Armies had unexpectedly occupied the Dutch Republic just a few weeks later, van Marum began to emphasise the past and potential future benefits of his research even more. In his very first lecture before a larger audience for example, given a year after the previous statement was made, he opened with the words:

"Physics [*De Natuurkunde*] is a science, which, when it is more generally known and practised, can bring many benefits in society. I have expressly demonstrated this when I began to give lectures on Physics here in this city more than 18 years ago in a public address, and experience has since then abundantly confirmed that I have not exaggerated the usefulness of this science or have said too much in my recommendations of it."[131]

Although van Marum was most likely adapting to political circumstances here, this statement is not even stretching the truth. In fact the only manner in which his statements on the purpose of his research during the French period seem to differ from any other period in his life, is that he always mentions potential benefits to society first, and then the physico-theological aspect, rather than the other way around. And neither did van Marum stop mentioning potential practical benefits in later years. In the recollections he penned in the 1820s he repeatedly chides the trustees for not having attached enough importance to these benefits. By this time, Napoleon was literally history.

A further indication that van Marum would have been the last to denounce utilitarian ideals, is that throughout his long life he displayed an immense desire to communicate any knowledge he had acquired, i.e. to spread it, make it available, and make it understandable. Van Marum was anything but the reclusive, inaccessible, lonely scholar. The host of lectures he gave, and from which all the quotes above have been taken, are testimony to this; so is his host of publications through a wide range of media, i.e. not only in specialists' journals such as the Proceedings of Teylers Second Society, but also in more widely read journals such as the *Algemeene Konst en Letterbode*; finally, his copious correspondence underscores his desire to communicate.

What's more, even though Teylers Museum was still a far cry from an educational centre that conveyed knowledge through its displays, van Marum attached some importance to the fact that it should serve as a possible resource for those who wanted to learn more about nature

[130] "het uitgebreide inzien het geen zij ons in den werken van den Schepper geeft en het nut het geen zij in de zamenleeving heeft aangebracht, en verder schijnt te belooven hebben"; "Lectiones Physico-chemicae, juxta Fourcroy Philos. Chem., ut et De inflammatione et combustine legni, alcorumque combustulium et de extinctione incendiorum", 08.11.1794, Haarlem, NHA, Archief van Marum, vol. 529, nr. 12.

[131] "De Natuurkunde is eene wetenschap, die, wanneer zij meer algemeen gekend en beoeffend worde, veelvuldige voordeelen in de zamenleeving kan aanbrengen. Dit heb ik, voor ruim 18 Jaaren, toen ik aanving hier ter steede Natuurkundige Leszen te houden, door eene openbaare redenvoering, opzetlijk aangetoond, en de ondervinding heeft sederd overvloediglijk bevestigd, dat ik toen geenzins de nuttigheid deezer wetenschap te groot heb opgegeeven of ter aanprijzing van diezelve [unreadable] te veel gezegd heb." "Openbare lessen in 1795 & 1796", 11.11.1795, Haarlem, NHA, Archief van Marum, vol. 529, nr. 12.

and its workings. Recall how the acquisition plan for the instrument collection which he drew up in 1789 included models with the express purpose of enabling visitors to understand various principles of technology that had a bearing on everyday life; or, how around the turn of the century van Marum was striving to make the geological collections as accessible as possible. Finally, in a similar vein, what has not been mentioned yet is a plan that van Marum devised in 1810 upon the behest of Napoleon's representative in the Netherlands. The entire country had been annexed by this time and formed part of the French Empire. Van Marum's plan basically proposed transforming Teylers Museum into something akin to an école polytechnique. These plans had no impact whatsoever, because Napoleon's retreat from the Low Countries soon after appears to have led to the plans being discarded almost immediately, and it is perhaps even doubtful whether van Marum really wanted to see them pursued himself, given that he had drawn them up by order of the French – but, if anything, what they do clearly demonstrate is that van Marum had no difficulty whatsoever thinking in utilitarian terms.

So van Marum clearly was an advocate of utilitarian ideals – but at the same time, one has to be careful not to go too far in one's conclusions. Put simply, van Marum had a pronounced utilitarian streak, but he wasn't a die-hard radical in this respect. The crucial point is that he was clearly of the opinion that knowledge should serve some practical purpose, i.e. should contribute to the improvement of people's daily lives or it would be wasted, but at the same time the primary focus of all his work lay with the systematic accumulation of knowledge, i.e. research, on the workings of nature. Put differently, van Marum did not consider it beneath him to involve himself with practical appliances – in actual fact the whole idea that a distinction between "applied sciences" and "pure science" was somehow justified, as well as the idea that the latter was in some way superior to the former and therefore also more prestigious only emerges during a later period in history – but his main interest lay with the experimental study of nature.[132]

This in turn helps explain some of the things he did – or rather some of the things he didn't do – which might otherwise seem puzzling. There is his apparent lack of interest in the *Oeconomische Tak* for instance, which had been formed in 1777 as part of the Holland Society, with the purpose of the "promotion of Trade, Arable Farming and Agriculture, Shipping and Fisheries, etc. in our Country and in the Colonies of this State".[133] Its ties with the Holland Society were cut early during the French period, and by the second half of the 19th century, the *Oeconomische Tak* had evolved into the Manufacturers' Society. Van Marum doesn't seem to have been particularly bothered by the fact that it was separated off from the Holland Society, and did not for instance attempt to merge the two associations while he was secretary of the Society – although later in life he did repeatedly accept a seat on the jury that

[132] On the lack of distinction between "applied sciences" and "pure sciences" see: Bert Theunissen, *"Nut en nog eens nut": wetenschapsbeelden van Nederlandse natuuronderzoekers, 1800-1900* (Hilversum: Verloren, 2000), 13–36.

[133] "bevorderinge van den Koophandel, Land- en Akkerbouw, Zeevaart Visscheryen, enz. in ons Vaderland en in de Volksplantingen van deezen Staat"; Bierens de Haan, *De Hollandsche Maatschappij der Wetenschappen, 1752-1952*, 167. An earlier attempt to reform the entire Society had been thwarted by the Directors.

was tasked with assessing contributions to a national manufacturers' fair, in 1809, 1820 and 1825. (The fairs were held in Amsterdam, Ghent and Haarlem respectively.)[134]

What is even more striking though is that van Marum showed no interest in the *Oeconomische Tak*'s cabinet of models (*Modellen Kabinet*), which was established in 1783 with the aim of storing models that illustrated technological principles and models that were part of patent applications. Its budget appears to have been a lot smaller than Teylers Museum's and it was never prominent enough to attract much attention, but nevertheless the minutes of the *Oeconomische Tak*'s meetings suggest it was upheld and expanded for many decades, even being opened to the general public in 1825.[135]

Similarly, it has been noted previously that while van Marum did get into contact with many members of the Royal Society during his trip to London in 1790, he completely neglected the "Society for the Encouragement of Arts, Manufactures and Commerce". This is all the more striking because the Society of Arts, as it was referred to, had just moved to new premises near the boarding-house where van Marum was staying. As has been pointed out before, "[o]ne might conclude from Van Marum's behaviour in London that he was less intensely interested in these social and economic possibilities of the natural sciences [as propounded by the Society of Arts and the *Oeconomische Tak*] than in the actual internal development of science and research".[136]

All this is worth keeping in mind when trying to understand how van Marum would have defined the position of Teylers Museum within the topography of Dutch collections.

5. This Way Up

One final point needs to be addressed in trying to understand what van Marum wanted to achieve through his research, as well as what motivated him, and that is that van Marum was perfectly aware of how his research could help him establish and maintain a position in the upper echelons of society.

This was a reciprocal process: attaining a certain status, reputation, and level of prestige helped van Marum attain his own research objectives. In Bourdieu's terms, he was acquiring cultural capital that he could spend on his research. So it would be far too simple to depict van Marum as "career-hungry" and obsessed with his social status – but at the same time one

[134] Forbes, "Applied Technology," 324–326.
[135] For a very brief summary of the cabinet's history and function see: Titus M. Eliëns, *Kunst, nijverheid, kunstnijverheid: de nationale nijverheidstentoonstellingen als spiegel van de Nederlandse kunstnijverheid in de negentiende eeuw* (Zutphen: Walburg Pers, 1990), 38. For transcripts of the meetings in which the cabinet was discussed between 1783 and 1840 see: "Modellen Kabinet, besluiten daaromtrent", 1783-1840, Haarlem, NHA, Nederlandsche Maatschappij voor Nijverheid en Handel te Den Haag, vol. 609, nr. 844.
[136] R.J. Forbes, "Introduction," vol. 2, Martinus van Marum: Life & Work (Haarlem: Tjeenk Willink & Zoon, 1970), 7.

cannot deny that he was a social climber, and his ascension was in large part due to the success of his scientific activities.

That he was aware of all this transpires from a variety of his activities and statements. One example is what can almost only be described as his vigorous campaign to be elected to the Royal Society.[137] Another instance in which it becomes clear that van Marum was aware of the wider implications of his statements is provided by the fact that he is the only member of the Second Society ever to remonstrate the minutes of a previous meeting.[138]

Perhaps the best example, however, is again provided by the series of lectures he gave over the course of the years. All of these could in fact be construed as serving as the means to an end – the end, more precisely, of ensuring potential patrons' goodwill and enhancing the lecturers', i.e. van Marum's, reputation.

His appointment as town lecturer for instance ensured that he could build a network amongst all those interested in experimental science in Haarlem, many of which, such as Barnaart or even van Zeebergh, were members of the town's elite.

His series of lectures for the trustees and members of Teylers Second Society ensured that they did not lose interest in the collections van Marum was acquiring – and hoping to expand – with their support, and that they understood – or were at least susceptible to – his arguments as to why specific acquisitions would have to be made in the future.

Finally, considered from a political standpoint, van Marum's public lectures given between 1795 and 1797, i.e. in the aftermath of the French occupation of the Dutch Republic, are the most intriguing. It has already been mentioned how it is noticeable that he emphasises the potential practical benefits of all research more than he does in any of his other lectures. However, it has also been made clear that in doing so van Marum did not have to betray any of the principles he had previously held. So in how far his advocacy of utilitarian ideals in these lectures was genuine, and in how far it was a matter of circumstance, is difficult to determine exactly.[139]

What is clear, however, is that van Marum was well aware of the changes in the political climate around him, and what potential impact they had on the overall status of research. It is interesting to chart his reaction in the immediate aftermath of the French Army's arrival: he had started giving a series of lectures on chemistry to the trustees in November 1794.[140] He had even gone to the bother of having parts of something akin to a textbook on chemistry by Fourcroy translated and printed in instalments, so that all of his listeners were, literally, on the same page.

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[137] Levere, "The Royal Society of London."
[138] "Notulen Tweede Genootschap", 12.02.1790, Haarlem, ATS, vol. 1382.
[139] Others have tried before. Mijnhardt for instance does not agree with Levere's assessment that van Marum emphasised the benefits of his research for society first and foremost out of opportunism: Mijnhardt, *Tot heil van 't menschdom: culturele genootschappen in Nederland, 1750-1815*, 321.
[140] "Lectiones Physico-chemicae, juxta Fourcroy Philos. Chem., ut et De inflammatione et combustine legni, alcorumque combustulium et de extinctione incendiorum", 1794-1795, Haarlem, NHA, Archief van Marum, vol. 529, nr. 12.

By the end of January 1795, van Marum had given six, presumably one-hour long, lectures – and the French had occupied Haarlem. During the last two lectures van Marum had already started talking about his newly devised methods for extinguishing fires rather than chemistry, and perhaps he was thereby preparing the ground for what was to come: on February 1st, van Marum radically changed the tone of his lectures. According to the transcript, he now addressed the trustees as "fellow citizens" (*Medeburgers*); and rather than printed, translated excerpts from Fourcroy's book, the lecture notes now consisted of what seem to be hastily written sheets of paper; finally, van Marum blatantly emphasised the benefit his fire extinguisher had brought society, even professing that anyone who wanted to could come and see the model he kept at home with his own eyes – perhaps he was trying to show he had absolutely nothing to hide.

So van Marum was clearly no longer just addressing the trustees through his lectures. It is worth bearing this in mind when considering what is perhaps the most interesting aspect of the series of lectures van Marum began to give later that year: the unprecedented (for van Marum) size of the audience. The exact size is difficult to determine, although his listeners must have numbered about a hundred, because the venue of his lectures is known: the Reformed church in Haarlem at the Helmbrekerssteeg; the building has since been demolished.[141] (Interestingly, van Marum had asked the Mennonite parish first whether he could use a church of theirs at the Peuzelaarsteeg as a venue but his request was rejected.[142]) Another indication that the audience was not only large but also diverse is provided by a slip of paper that has been preserved between van Marum's notes, with a statement evidently prepared by him that is worth quoting in full:

"As some Young people have abused the freedom granted to them to attend these lectures, and have behaved improperly during recent lectures, to the annoyance of many Citizens, in future no young people under 15 years old will be admitted to these lectures even if they have tickets, except only those who are brought along by their Father or their Guardian or by one of their relatives, who keep them near them and under their supervision. Young people under 15 years old, who are not accompanied by a father, guardian or relative, who keep them near them and under their supervision will therefore, to prevent further disorder and disturbances, be held back at the door by the stewards."[143]

Note how "tickets" were evidently required to attend the lectures.

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[141] On this bulding see: P. L. Slis, *De Remonstrantse Broederschap: biografische naamlijst, 1905-2005: gemeenten, landelijke organen, predikanten en proponenten, publicaties* (Delft: Eburon, 2006), 61.

[142] Simon Leendert Verheus, *Naarstig en vroom: Doopsgezinden in Haarlem 1530-1930* (Haarlem: Rombach Boek en Beeld, 1993), 129.

[143] "Vermits eenige Jonge lieden misbruik gemaakt hebben van de hun verleende vrijheid om deeze lessen bij te woonen, en zich bij de laatste lessen, tot hindernisse voor veele Burgers, onbehoorlijk gedraagen hebben, zo zullen voortaan geene jonge lieden beneden de 15 Jaaren ofschoon zij billets hebben, tot deeze lessen worden toegelaaten, dan alleen die geenen, die meegebracht worden of door hun Vader of door hun Gouverneur of door iemand van hunne naastbestaanden, die hun bij zich en onder hun opzicht houden. De Jonge leeden beneden de 15 Jaaren, welke niet vergezeld zijn van vader voogt of nabestaand vriend, die hun bij zich en onder zijn opzicht wil houden, zullen derhalven, ter voorkooming van verdere stoornisse en ongeregeldheid, door de oppassers bij de deure worden teruggehouden." "Openbare lessen in 1795 & 1796", 20.01.1796, Haarlem, NHA, Archief van Marum, vol.529, nr.12.

Given the circumstances under which this series of lectures was conceived, the novelty of the size and of the composition of the audience begs the question of whether van Marum was now availing himself of the political climate to implement a dream he had had for a long time, or to what extent he felt he had to expand the audience of his lectures in order to bolster his utilitarian credentials, thereby making sure he would be able to continue with his private research activities. Given that there is no more than circumstantial evidence surrounding this matter, a fully satisfactory answer to this question is unfortunately not possible. In later years van Marum at least kept claiming that he had repeatedly requested a large auditorium be constructed by the Foundation, so that he could give lectures to larger audiences. He mentions this in the recollections he penned in the 1820s, he explicitly says so in a letter to Charles-François Lebrun in 1811, the matter seems to arise during a discussion on the possible uses of the first annex to the Oval Room that was completed in 1824, and in his 1795 lectures van Marum appears to complain about the fact that he had not been provided with premises that would allow for a large audience by the Foundation.[144]

However, it is striking how all of these claims are made after 1795, and the minutes of the meetings of the trustees, as well as the minutes of the meetings of Teylers Second Society, contain no evidence to support the notion that the idea of a large auditorium was either floated by van Marum or seriously discussed and rejected by the trustees before the French occupation – even though that does remain perfectly plausible. What's more, in the introductory remarks to his 1795 lectures van Marum seems to be explaining that the reason he had never given lectures before such a large audience on behalf of the Teyler Foundation before, was that there were no adequate premises available in the vicinity of the Foundation's chemical laboratory, which made lectures on chemistry – van Marum's main interest at the time – impossible.[145]

Finally, there is the fact that van Marum terminated his lectures in 1797, apparently earlier than he had originally planned. He explained to his audience that he would not continue giving them because of the inadequacy of the premises, which is again perfectly plausible.[146] Yet it also fits what seems to be a more general pattern: the termination of all three of van Marum's lecture series coincide with the moment they ceased to benefit him in the ways described above. The lectures before a large audience ended in 1797, when French influence was beginning to wane; no records revealing that he might have continued on as town lecturer after his appointment to the directorship of Teylers Museum have been found; and he never gave lectures for the trustees or the Second Society anymore once he had had the major row with van Zeebergh early in 1803.

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[144] Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 131-132; on the letter to Lebrun see: Mijnhardt, *Tot heil van 't menschdom: culturele genootschappen in Nederland, 1750-1815*, 337. On the discussions in the 1820s see: Michiel Kersten, "Een schilderijenzaal of een gehoorzaal," *Teylers Magazijn* 13 (1986): 9–12. He complains most vociferously during his last public lecture: "Openbare lessen in 1795 & 1796", 11.11.1795, Haarlem, NHA, Archief van Marum, vol. 529, nr. 12.
[145] Ibid.
[146] Ibid., 08.03.1797.

Van Marum's status and reputation might also help explain why he never cut his ties with Teylers Museum, despite a number of offers to become a professor he received over the years, despite his relative independence as secretary of the Holland Society (a salaried post), and despite the fact that he almost wasn't on speaking terms with the trustees after 1803 – the point being that van Marum had not only made Teylers Museum, but Teylers Museum had essentially made van Marum too. Apart from his undeniable talent, it was the fact that it was generally known that the Teyler Foundation had considerable financial muscle, and that van Marum's opinion on how to invest the Foundation's money bore heavily on the trustees' decisions, which opened many doors for him. Van Marum must have known that it was his position as director of Teylers Museum, as much as his qualities as a researcher, that had enabled him to build his network and reputation.

6. Bottom Line

By placing all these snippets of circumstantial evidence next to each other, the vague outlines of van Marum's ideas on the production and the consumption of knowledge begin to emerge, and by extension one also begins to obtain an idea of what role "the public" played in any of his considerations.

It is clear that van Marum was a deeply religious man, was an empiricist, and considered it a waste not to apply the fruits of research to the overall benefit of society. As far as van Marum was concerned, the benefits of his research could be twofold: on the one hand his findings could bring about a better understanding of God's creation, or rather a realisation of the beauty that lay beneath its complexity, and secondly his findings could help improve every citizen's quality of life.

In this sense his aim was to serve the general populace. Yet at the same time he sort of kept his distance from that general populace, setting himself off from the masses: he was perfectly comfortable for instance with giving his lectures to a select, small audience – the only time he demonstrated scientific principles to a large and diverse audience of complete laypeople was under some political pressure, in the aftermath of the French Revolution, just one year after Lavoisier had been guillotined, and during a period in which the Dutch were forced to emulate their French neighbours in referring to each other as "citizens", rather than any other title that might suggest non-meritocratic social privilege.

So in no small part van Marum was perhaps still rooted in a tradition of science as a gentlemanly pastime, and perfectly comfortable with that too; but he was equally capable of using the general populace to further his own ends – in a way that actually benefitted the populace, it has to be said – once this began to emerge as the main political category through which any form of power, influence, or privilege had to be legitimised.

Of course, interaction with "the public" was more than an abstract idea in the sense that the museum was, in principle, open to visitors from the very beginning on. What archival sources reveal about these visitors and what they experienced on a visit to Teylers Museum is the topic of the following section.

III Open All Hours: Public Accessibility of Teylers Museum 1780-1840

1. The Tourist Trap

The first railway connection in the Netherlands was inaugurated in 1839. From that point on, steam engines ran between Haarlem and Amsterdam, immensely speeding up travel between these two towns. One can be pretty sure that van Marum would have been ecstatic about this newest development. He had already tried to obtain a model of Boulton and Watt's steam engine on his trip to England in 1790, and some thirty years later he was still lamenting the fact that his efforts had not been successful, stating that the steam engine was "the most excellent and useful machine that has been devised by human ingenuity".[147] Alas, he did not live to see the establishment of a railway network in the Netherlands: he passed away in 1837.

In some way it is almost symbolic that van Marum passed away so soon before he could have taken a train to Amsterdam: it drives home the point that van Marum belonged to an era of travel that was rapidly drawing to a close by the time he grew old.

As in every other country at the time, it is hard to underestimate the changes brought about by the establishment and rapid expansion of the Dutch railway network. Less than ten years after the first trains had rolled into Haarlem for instance, a guidebook was published providing information on the landscape surrounding Haarlem. It was aimed at

"the Inhabitants of *Rotterdam, Schiedam, Delft* and other towns located close to the Holland Railway, who might now wish to make a one-day trip to Haarlem and to stay there for about twelve hours".[148]

Ironically, the immediate impact for Teylers Museum of the establishment of the rail network appears to have been minimal. It is not, for example, mentioned in the guidebook from which the quote is taken. The aim of the daytrips suggested in this book was to escape city life, and spend time in the countryside. Haarlem itself was therefore not recommended to its readers.

[147] "het voortreffelijkste en nuttigste werktuig gewis, hetgeen door het menschelijk vernuft is uitgedacht"; Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 34.

[148] "de Inwoners van *Rotterdam, Schiedam, Delft* en andere zich in de nabijheid des HOLLANDSCHEN SPOORWEG bevindende plaatsen, die thans op éénen dag uit en thuis, een uitstapje naar Haarlems dreven zouden wenschen te doen, en aldaar omtrent twaalf uren vertoeven"; *Wegwijzer in Haarlems Omstreken* (Haarlem: Erven F. Bohn, 1848), 1.

But on a more general level, and in the long term, the railway's effects were of course huge. And here, the guidebook can help to illustrate some of the developments.

The entire concept of "leisure time", for instance, would not have been understood at the end of the 18th century. Let alone the idea of "tourism". The late 18th century was still the era of the Grand Tour: young members of the nobility and others who could afford it would spend a year or more travelling Europe – Italy was the destination of choice for most – in what amounted to a sort of self-exploratory exercise. Mass tourism on the other hand only emerged towards the end of the 19th century, brought about by a combination of larger sections of the population earning "time off" and travel becoming easier, faster, and more affordable.

All this inevitably had an impact on the public role of museums. Put simply, museums could only become tourist attractions once there were tourists.

That there were no tourists during van Marum's active period at Teylers Museum and, on a more general level, just how different travel was from what we know today during the early decades of Teylers Museum's history, is important to keep in mind when assessing the museum's public role during this period. For one, it has implications for the museum's accessibility, i.e. who could actually come to visit it. Secondly, and perhaps more importantly, it can serve as a reminder of just how profound the changes to society and the average citizen's outlook on life were that were brought about around the turn of the century. Both these points, in turn, are important to take into account when trying to shed some light on the question of who visited the museum, and what brought visitors there, i.e. what these visitors' expectations were and what they hoped to gain from a visit to the museum.

There are a number of sources that one can draw upon in trying to find answers to these questions. Firstly, there are the rules and regulations that were put in place for visitors by the trustees and van Marum. Secondly, there are the museum's visitor's books: as from 1789, every visitor was asked to sign his name upon visiting the museum and record where he came from. Unfortunately however from a historian's perspective, very few visitors included their occupation, and if the signatures themselves are decipherable, the signees are often hard to identify. Finally, there are travel reports published by visitors upon their return home. They can be particularly revealing because they not only contain the author's personal experiences, but often doubled as guidebooks for future travellers. Impersonal guidebooks such as those published by Baedeker or the one that was quoted above only came up around the middle of the 19th century. About a dozen reports covering the first forty years of the museums' history have been found.

2. Open Office

It was already mentioned in the previous chapter that in principle Teylers Museum was open to the public from the very beginning on. This seems to have been a real priority of the

trustees', given that they essentially chided van der Vinne for complaining about the burden of visitors. Interestingly, the museum's general accessibility was important to the trustees despite Pieter Teyler not mentioning that his collections should be open to anyone besides those associated with the Foundation. It has also been shown how the new museum evidently generated some interest among strangers even before the Oval Room had been completed and how, once the electrostatic generator had been installed in the museum, fixed opening hours were set by the trustees following a suggestion by van Marum. Visitors from outside Haarlem were welcome for one hour every day of the week except Sunday, residents of Haarlem could see the collections every Tuesday between 10am and 1pm.

Every visit followed the same procedure, which was to remain in place throughout van Marum's lifetime: tickets could be picked up either at van Marum's home or at the home of one of the trustees on the day of the visit. They were free of charge, although it appears visitors were expected to tip the servants of the Foundation House, especially the *kastelein*'s servant who would accompany visitors through the museum and show them around. This can be deduced from the fact that these gratuities were discussed in 1790, and the servants were forbidden to accept them after 1826 – although they were then compensated for their loss of income by the trustees.[149]

Aside from the opening hours, some rules restricting access were in place. Obtaining tickets from van Marum or the trustees meant potential visitors could be screened. No instance in which a person showing interest was turned down was ever recorded, but one visitor who arrived on van Marum's doorstep in 1803, the German civil servant Kaspar Heinrich von Sierstorpff, did record how he was critically examined by the director. He describes the experience as follows:

"The first thing I did the next morning was to visit Professor van Marum. Hoping to get acquainted with this Physicist and Co-Director of the famous Taylor Museum, I had obtained letters of reference to him. He did not however welcome me with the politeness which I had become accustomed to after dealing with French scholars, but more like a custodian of such an institution who has tired of endlessly giving strangers guided tours. After a formal exam to assess whether I had read any of his works and how much of these I might understand, I received a written referral to the so-called servant of the museum and was allowed to come back a few hours later."[150]

Van Marum also suggested the amount of visitors that were allowed to enter the museum at the same time should be restricted, to fourteen. The aim was clearly to prevent any damage to the valuable instruments housed in the Oval Room, but this formed a restriction nonetheless.[151]

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[149] "Directienotulen", 24.09.1790, Haarlem, ATS, vol. 5. On the change of rules in 1826 see: "Directienotulen", 24.10.1826, Haarlem, ATS, vol. 7. I am grateful to Geert-Jan Janse for drawing my attention to this passage in the minutes of the trustees' meetings.

[150] Kaspar Heinrich von Sierstorpff, *Bemerkungen auf einer Reise durch die Niederlande nach Paris im eilften Jahre der großen Republik*, vol. 2, 1804, 559. Published anonymously, later attributed to von Sierstorpff.

[151] "De Heeren Directeuren van Teijlers Fundatie gelieven te overweegen ...", c. 1784, Haarlem, ATS, vol. 20. This is clearly van Marum's handwriting.

Interestingly, in June 1790 another amendment to the rules was introduced. The minutes of the trustees' meetings read:

"As visits to the Museum can often not be allowed in the morning because of Experiments being performed or arrangements being made, it is decided, on such occasions and because of other circumstances that may arise, to restrict visits to the Museum to the afternoon from 3 to 4 o'clock with notes from the Director and accompanied by the servant."[152]

In other words, the museum was first and foremost a place of research, and visitors were occasionally getting in the way – or rather van Marum's way. Note that this is before his trip to London, and before the addition of a separate laboratory to the premises. It is not that visitors were not welcome: upon van Marum's return from London and the start of the instrument maker Fries's employment by the Foundation some three months later, the rules were amended again, and the opening hours were actually extended. Fries, rather than the "servant", was now entrusted with accompanying visitors during their tour through the museum – although he had to share any gratuities he received with the servant girls at the Foundation House – and received instructions that he was to grant visitors access to the Oval Room not only between noon and 1pm, but also between 3pm and 4pm. A provision was added that if experiments or other work was being conducted that did not allow for the presence of visitors, they could be told to return at 3pm.[153]

This entire episode drives home the point that during this stage of its history, Teylers Museum was not a public institution that sought to actively attract visitors, but a research centre that was open to the public. It is all the more notable how adamant the trustees remained, however, that the museum should be open to anyone who showed an interest, for example by extending the opening hours to accommodate for van Marum's research activities in 1790.

The rules and the admission procedure essentially didn't change over the course of the next decades. Tickets were no longer written out by hand, but printed as from 1805.[154] That same year, the decision was taken to announce in advance through local newspapers whenever the museum needed to be closed for cleaning, so that visitors "will not be disappointed".[155] Clearly, visitors were still being taken into account.

The fact that in 1810 the trustees emphasised that the museum was only accessible "under certain conditions" in a letter to the mayor of Haarlem most likely has to do with the fact that they were wary of the mayor's intentions. Perhaps worried that the town could stake a claim to some form of influence on the Foundation's decisions if some of the institutions the Foundation funded (such as the almshouse or the museum) were classified as "public", they

[152] „Alzo te meermaalen door het neemen van Proeven of maaken van Schikkingen in het Museum de bezigtiging van hetzelve des voormiddags niet kan toegelaaten worden, word beslooten, bij zodaanige gelegenheden en om andere voorkomende Omstandigheden , het Musaeum des namiddags van 3 tot 4 uren te laaten bezigtigen met briefjes van den Directeur en onder geleide van den Knegt." "Directienotulen", 04.06.1790, Haarlem, ATS, vol. 5.
[153] "Directienotulen", 24.09.1790, Haarlem, ATS, vol. 5.
[154] "Directienotulen", 06.09.1805, Haarlem, ATS, vol. 6.
[155] "niet teleurgesteld worden"; as quoted in: 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), 16.

emphasised that all of the Foundation's organisations were "according to the express wish of the Testator, administrated and treated as private property".[156]

At the same time, as the years progressed, the trustees were willing to go to greater lengths to enable more people to benefit from the collections. In July 1825 the National Manufacturers' Fair was held in Haarlem, and Teylers Museum was open every day except Sunday from noon to 3pm throughout the entire month. In a move that provides an indication of just how many visitors were expected, the amount of tickets was limited to 100 per day.[157]

As has been mentioned before, by 1826 the museum's premises had been extended, so that they now included a reading room and extra shelf space for the library. Rules were set up for the library's usage in 1825. It was to be open to citizens of Haarlem every Wednesday and Saturday between 1pm and 4pm, and every day except Sunday from 1pm to 2pm to visitors from out of town. Users had to be above the age of 18. Tickets to the library could be obtained from either the trustees or van Marum and his assistant librarian. These tickets were handed out independently of those for the museum, which "remains accessible to each and everybody", as was explicitly stated.[158] Books were not available on loan, smoking was strictly forbidden, and a "proper silence" was to be kept in the reading room. In case the librarian was not present, it was up to the assistant librarian to ensure that visitors behaved adequately.[159] Finally, a limited number of tickets was made available – 80 upon the reading room's opening – "in order to prevent as much as possible an all too great influx of inhabitants of this city at the opening of the Library".[160]

Determining exactly how many visitors came to Teylers Museum over the course of the first decades of its existence is, unfortunately, impossible. The restrictions listed above provide an indication, but one cannot know for sure whether they were called for or met. The visitor's books contain between 300 and 400 signatures per year.[161] They include the signatures of all those who published detailed travel reports that leave no doubt they actually visited the museum, but it is of course impossible to determine whether every visitor to the museum really signed the book.[162] Those who were keeping a diary with intention of publishing their experiences and those who had come from far afield might have been more inclined to leave a trace of their visit anyway, and citizens of Haarlem might have been less inclined to do so. Either way, one can safely say that at least a few hundred visitors came to see Teylers Museum every year. This sounds as if one did not exactly have to queue to obtain a ticket or

[156] "onder zekere bepalingen"; "volgens den uitdrukkelijken wil van den Testateur, als een particulier eigendom bestuurd en behandeld wordende"; "Directienotulen", 31.08.1810, Haarlem, ATS, vol. 6. Cf. Mijnhardt, *Tot heil van 't menschdom: culturele genootschappen in Nederland, 1750-1815*, 331.
[157] Janse, "Uit nieuwsgierigheid en ter onderricht," 18.
[158] "voor elk en een iegelijke toegankelijk blijft"; "Directienotulen", 20.05.1825, Haarlem, ATS, vol. 7.
[159] "behoorlijke stilte"; Ibid.
[160] "ten einde zoo veel mogelijk bij de opening van de Bibliotheek, den alte grooten toevloed van bewoners dezer stad te voorkomen"; "Directienotulen", 14.04.1826, Haarlem, ATS, vol. 7.
[161] I am grateful to Geert-Jan Janse for sharing with me the precise amount of annual signatures, which he established as part of the research for his article "Uit nieuwsgierigheid en ter onderricht". Cf. Janse, "Uit nieuwsgierigheid en ter onderricht," 14–18. Geert-Jan Janse, pp. 14-18.
[162] Such as, for example, Georg Forster, Kaspar Heinrich von Sierstorpff and August Hermann Niemeyer.

to get in, but at the same time this is no inconsiderable number for what had started out as the repository of two private learned societies.

3. Eyes Wide Open

A sense of what visitors experienced during a visit to Teylers Museum can be obtained from the travel reports some of them published upon returning home. They are revealing in many ways. It is reassuring to any student of Teylers Museum for instance to see that almost all of the dozen or so travellers who visited Teylers during the first decades of its history were stumped by the Foundation's organisational structure – almost none of them gives a correct summary of Pieter Teyler's intentions in writing his will, or the history of the institutions under the Foundation's purview. More importantly though, their descriptions of the museum provide snapshots of developments at the museum, unbiased in the sense that they are provided by outsiders, rather than anyone affiliated with the Teyler Foundation.

It is remarkable how all of the visitors were impressed by the magnificence of the Oval Room. An anonymous English gentleman who arrived at Teylers Museum in 1790 for instance described it as "extremely lofty, spacious, and handsome", another anonymous visitor who came to Haarlem that same year spoke of an "excellent round Hall", the German physics teacher Johann Friedrich Droysen who visited in 1801 considered the building "worthy of its rich founder, beautiful and elegant", the aforementioned Sierstorpff spoke of a "magnificent and very spacious building", the co-director of the Franckesche Stiftungen in Halle August Hermann Niemeyer echoed his compatriot's sentiments in describing the Oval Room as a "magnificent building" upon seeing it in 1806, and so on.[163] Many were also struck by the contrast of the building's unassuming outer façade, and the glamour of its interior – recall that visitors entered the museum through the Foundation House, and had to pass through the trustees' meeting room before entering the Oval Room. The anonymous traveller from 1790 for instance stated "the access [is] somewhat poor" before praising the interior, and Sierstorpff recounted how "[o]ne is first led through a succession of rooms, which serve as meeting places for the five Conservators [trustees] and for similar events. Here everything is nicely furnished and richly decorated".[164]

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[163] "vortrefflichen runden Saal"; "seines reichen Stifters würdig, schön und geschmackvoll"; "prächtiges und sehr geräumiges Gebäude"; "prächtiges Gebäude"; *An Entertaining Tour, Containing a Variety of Incidents and Adventures, in a Journey through Part of Flanders, Germany & Holland* (London: H.D. Symmonds, 1791), 243; *Bemerkungen auf einer Reise nach Holland im Jahre 1790* (Oldenburg: Gerhard Stalling, 1792); Johann Friedrich Droysen, *Bemerkungen, gesammelt auf einer Reise durch Holland und einen Theil Frankreichs im Sommer 1801* (Göttingen: Heinrich Dieterich, 1802), 109; Sierstorpff, *Bemerkungen auf einer Reise durch die Niederlande nach Paris im eilften Jahre der großen Republik*, 2:556; August Hermann Niemeyer, *Beobachtungen auf Reisen in und außer Deutschland*, vol. 3 (Halle: Buchhandlung des Waisenhauses, 1824), 151.

[164] "der Zugang [ist] etwas ärmlich"; "[m]an wird zuerst in einige Zimmer geführt, die zu den Zusammenkünften der fünf Conservatoren, und bey ähnlichen Gelegenheiten gebraucht werden. Hierin ist alles

The building is not all the visitors were impressed by. All of them spoke of the museum's collections in the highest terms – the instrument collection above all was singled out for praise. The German explorer Johann Georg Forster – who travelled with his teacher Jeremias David Reuss and his young and soon-to-be-famous friend Alexander von Humboldt – was led around the museum by van Marum himself, and recorded how he and his companions had seen "the library, a collection of prints, an incomparable assembly of physical instruments and an already very substantial and beautiful natural history cabinet."[165] To quote just a few others, Sierstorpff described how "[A]ll shelves are full of the best and most expensive physical instruments", and the books were "all arranged in the finest bindings"; Niemeyer wrote of the "most exquisite minerals" and "all kinds of the most valuable physical instruments".[166]

It is also interesting to see how the collections' gradual expansion is reflected in these travel reports. The anonymous Englishman who visited in 1786 for instance pointed out that "the library indeed seems quite in its infancy".[167] The German author Sophie LaRoche, who published a description of the Netherlands in 1788, summarised that Haarlem would "soon" attract "scholars and strangers thirsty for knowledge", once what she wrongly thought was Teyler's last will and testament had been fully implemented.[168] Two years later, while van Marum was still in England buying as many instruments as he could, another German author, Nina d'Aubigny von Engelbrunner, recorded in her travel diary that "[t]his institute is far from completed".[169]

Almost ironically, many of the visitors were as critical of the museum's and its collections' splendour as they were impressed by it. Initially their surprise at the wealth they encountered appears to have been expressed by repeating what they heard about Pieter Teyler being stingy and greedy.[170] As time progressed, however, the Foundation itself was increasingly chided for its financial policies. Forster for instance wrote:

"The executors of this estate could undoubtedly, if they were inspired by true zeal for science, spend even larger amounts of money in the spirit of the founder without having to worry to find themselves lacking in funds, or even exhausting the annual interest of the enormous

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schön meublirt und reich verziert"; *Bemerkungen auf einer Reise nach Holland im Jahre 1790*; Sierstorpff, *Bemerkungen auf einer Reise durch die Niederlande nach Paris im eilften Jahre der großen Republik*, 2:557.

[165] "die Bibliothek, eine Kupferstichsammlung, einen unvergleichlichen Apparat von physikalischen Instrumenten und ein bereits sehr ansehnliches und prächtiges Naturalienkabinet." Georg Forster, *Ansichten vom Niederrhein, von Brabant, Flandern, Holland, England und Frankreich im April, Mai und Junius 1790*, vol. 9, Georg Forsters Werke (Berlin: Akademie-Verlag, 1958), 325.

[166] "Alle Schränke stehen voll der besten und theuersten physikalischen Instrumente"; "alle in den prächtigsten Einbänden aufgestellt"; "ausgesuchtesten Exemplare der Mineralien"; "kostbarsten physikalischen Instrumenten aller Art". Sierstorpff, *Bemerkungen auf einer Reise durch die Niederlande nach Paris im eilften Jahre der großen Republik*, 2:558 & 560; Niemeyer, *Beobachtungen auf Reisen in und außer Deutschland*, 3:151.

[167] *An Entertaining Tour, Containing a Variety of Incidents and Adventures, in a Journey through Part of Flanders, Germany & Holland*, 243.

[168] "Gelehrte und wißbegierige Fremde"; Sophie La Roche, *Tagebuch einer Reise durch Holland und England* (Offenbach: Ulrich Weiß & Carl Ludwig Brede, 1788), 108.

[169] "Dit hele instituut is alles behalve af"; Nina d'Aubigny von Engelbrunner, *"Niet zo erg Hollands": dagboek van een reis naar Nederland (1790-1791)* (Hilversum: Verloren, 2001), 72.

[170] See chapter 2.

capital. But when there is such an amount of money, the temptation to multiply and accumulate is difficult to resist".[171]

He might have been repeating what he had heard from the museum's director – although van Marum would in actual fact have had little to complain about in this year – but thirteen years later Sierstorpff did not get to meet van Marum, and still concluded that the Foundation was not spending its money sensibly. As he put it:

"Incidentally this institute is a rare example that in some cases overly large expenditures can become a disadvantage. The annual income of this museum is supposed to be so large, that, although the trustees, stewards, [as well as] more mechanics and similar people receive very generous salaries, one is often at a loss as to how to spend the money appropriately!!"[172]

The two exclamation marks emphasise his indignation, which he summed up in the following, scathing way: "Thousands are wasted here on things, which would have been more useful and practical if they had cost at most one tenth".[173] Sierstorpff's judgement is all the more striking because he came to the museum full of enthusiasm. Perhaps he was put off by the way he had been treated by van Marum. Yet his sentiments were echoed by the Dutch author Margaretha Jacoba de Neufville, who visited Teylers Museum in July 1812. She was taken with what she saw, but complained that she would have enjoyed it even more and even spent a few days at the museum

"if for an ignorant visitor like myself, there would be more opportunity to receive some instruction concerning the various objects that one sees, but this is lacking entirely."[174]

She found it frustrating that

"even the books one can see externally and touch through a fairly dense lattice , but apart from the title on the spine one cannot read anything, because the cupboards in which they stand are closed, and the steward who accompanies you hasn't got the key."[175]

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[171] "Die Administratoren dieses Vermächtnisses könnten ohne Zweifel, wenn wahrer Eifer um die Wissenschaft sie beseelte, noch weit größere Ausgaben in dem Geiste des Stifters bestreiten, ohne Besorgniß, sich von Mitteln entblößt zu sehen, oder auch nur die jährlichen Zinsen des ungeheuren Kapitals zu erschöpfen. Allein die Versuchung bei einer solchen Geldmasse ist zu groß zum Vermehren und Anhäufen, als daß man ihr widerstehen könnte". Forster, *Ansichten vom Niederrhein, von Brabant, Flandern, Holland, England und Frankreich im April, Mai und Junius 1790*, 9:325–326.

[172] "Uebrigens ist dieses Institut ein seltenes Beyspiel, dass auch gewissen Dingen eine zu grosse Kostenverwendung nachtheilig werden kann. Es soll die jährliche Einnahme dieses Museums so beträchtlich seyn, dass, obgleich die Directoren, Aufseher, mehr Mechaniker und dergleichen Leute sehr ansehnliche Besoldungen davon geniessen, man oft verlegen ist, das Geld zweckmässig anzubringen!!" Sierstorpff, *Bemerkungen auf einer Reise durch die Niederlande nach Paris im eilften Jahre der großen Republik*, 2:562.

[173] "Tausende werden hier für Dinge verschwendet, welche nützlicher und brauchbarer seyn möchten, wenn sie höchstens den zehnten Theil gekostet hätten". Ibid., 2:558–559.

[174] "indien er voor een onkundigen bezigtiger zoo als ik, beter gelegenheid ware om eenig onderrigt aangaande de verschillende voorwerpen welke men ziet, te bekomen, maar hier aan ontbreekt het geheel." Margaretha Jacoba de Neufville, *De kleine pligten: eene oorspronkelijke zedelijke voorstelling in brieven uit het begin der negentiende eeuw*, vol. 3 (Amsterdam: P. den Hengst en zoon, 1824), 175. I am grateful to Geert-Jan Janse for drawing my attention to this publication.

De Neufville therefore concluded: "Therefore such a collection of all kinds of beautiful things that have been brought together there is, I think, of much less use than it might be", albeit adding that by the time she published this, the library's reading room had been opened, and her criticism had been met.[176]

Similarly, it is striking that not one of the visitors that published a travel report saw the electrostatic generator in action. The Englishman who was shown the museum in 1786 already stated that "All the philosophical instruments are kept in cases, which are not opened to strangers".[177] The anonymous visitor in 1790 wrote of the "Electrostatic generator, which I should have liked to see in operation".[178] Droysen was given a long list of dubious reasons as to why it could not be set in motion for him (this was only possible in the trustees' presence, for example), and suspected there was some truth to rumours he had heard in Amsterdam that one of the discs was actually broken.[179] Sierstorpff asked van Marum for a demonstration, but to no avail. As he recalled:

"Expressing my wish to witness the effects of the large electrostatic generator, I received the blunt and typically Dutch answer: one would have a lot to do if one set the machine in motion for each and every stranger."[180]

As his compatriot Karl Asmund Rudolphi noted upon visiting Teylers Museum one year later: „It is no good arguing with van Marum, for he seems to be a hypochondriac".[181] Together with the electrostatic generator's reputed cost of more than f8000,-, this will have had some bearing on van Sierstorpff's conclusion that this instrument was "because of the many attached brass ornaments and sharp corners more of a magnificent scientific furniture piece [*physikalisches Meuble*] than a tool that could be usefully applied". With what almost amounts to biting sarcasm, he added: "It is displayed in a beautiful case, and it is at most turned around a few times when some bigwig wants to see all these things with eyes on stalks."[182]

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[175] "zelfs de boeken kan men uitwendig zien en door een vrij digt traliewerk met den vinger aanroeren, maar behalve den titel op den rug gedrukt, kan men er niets van te lezen bekomen, want de kassen in welke zij staan zijn digt gesloten, en de oppasser die met u rondgaat, heeft den sleutel niet." Ibid.

[176] "Zoodoende is, dunkt mij, zulk eene verzameling van veelsoortig fraais als daar te zamen is, van veel minder nut dan die zou kunnen wezen". Ibid.

[177] *An Entertaining Tour, Containing a Variety of Incidents and Adventures, in a Journey through Part of Flanders, Germany & Holland*, 243.

[178] "Elektrisirmaschine, deren Wirkung ich wol hätte sehen mögen"; *Bemerkungen auf einer Reise nach Holland im Jahre 1790*.

[179] Droysen, *Bemerkungen, gesammelt auf einer Reise durch Holland und einen Theil Frankreichs im Sommer 1801*, 110.

[180] "Auf meinen ihm geäusserten Wunsch die Wirkung der grossen Electrisirmaschine zu sehen, bekam ich aber ohne weitere Umstände die kurze echt Holländische Antwort: dass man viel zu thun haben würde, wenn man die Maschine für jeden Fremden in Bewegung setzen sollte." Sierstorpff, *Bemerkungen auf einer Reise durch die Niederlande nach Paris im eilften Jahre der großen Republik*, 2:553.

[181] "Es ist mit van Marum nicht gut zu streiten, da er hypochondrisch scheint"; Karl Asmund Rudolphi, *Bemerkungen aus dem Gebiet der Naturgeschichte, Medicin und Thierarzneykunde, auf einer Reise durch einen Theil von Deutschland, Holland und Frankreich*, vol. 1 (Berlin: Realschulbuchhandlung, 1804), 123.

[182] "der vielen daran befindlichen Bronzeverzierungen und scharfen Ecken halber mehr ein prächtiges physikalisches Meuble, als ein nützlich zu gebrauchendes Werkzeug"; "Sie steht in einem schönen Kasten zur Schau, und wird höchstens ein paar Mal umgedrehet, wenn etwa ein Hochmögender einmal alle diese Dinge wie

4. History in the Making

Sierstorpff's travel report is especially noteworthy for another reason. It has already been stated that he was struck by the immense value of the instrument collection. Because the instruments were so valuable, he went on to observe, they "had mostly never been used, because it is too much of a fuss to have to clean everything in the Dutch manner, and put it back on display again." What's more, he added: "[e]verybody who knows the practical sides of this field, has certainly experienced how soon the best instruments become redundant, because even better and more convenient instruments have been invented and many experiments can always still be performed in a more proper manner, and how little a really useful physics laboratory [therefore] lends itself to being turned into a dainty exhibition."

This, crucially, brought him to the following conclusion about the instrument collection at Teylers Museum: "the entire collection will someday only serve as testimony to the history of physics".[183]

Given that the earliest currently known example of a museum explicitly stating that it would preserve instruments for their historical value is that of the Conservatoire des Arts et Métiers in Paris, in 1801, Sierstorpff's statement from 1804 is remarkably early.[184] What is all the more stunning is that Niemeyer came to exactly the same conclusion, although he does not elaborate on it. In his report, Niemeyer wrote:

"All along the walls are mahogany cases with all kinds of the most valuable physical instruments, which, as the collection is steadily completed, will be able to serve as testimony to a history of physics."[185]

The fact that the visitor's books contain both these men's signatures proves Niemeyer was not just copying off Sierstorpff, despite the remarkable similarity of their choice of words. More importantly, while Sierstorpff was obviously critical of the way Teylers Museum was run, and perhaps spiteful about the way he had been treated by van Marum, this was definitely not the case with Niemeyer. In fact, Niemeyer is one of the few visitors to defend van Marum, whom he visited at his home after having been shown through the museum by the *kastelein*'s manservant. As Niemeyer put it:

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die Kuh das rothe Thor anstaunen will." Sierstorpff, *Bemerkungen auf einer Reise durch die Niederlande nach Paris im eilften Jahre der großen Republik*, 2:557–558.

[183] "grösstentheils noch gar nicht gebraucht worden, weil es zu viel Umstände macht, alles demnächst wieder Holländisch zu putzen und zur Schau aufzustellen."; "Jeder, der dieses Fach practisch kennt, hat auch gewiss erfahren, wie bald die bessten Werkzeuge bey Seite gestellt werden müssen, weil noch bessere und bequemere erfunden, und viele Dinge immer noch auf eine richtigere Weise experimentirt werden, und wie wenig sich ein eigentlich nützliches physicalisches Laboratorium zur zierlichen Ausstellung schickt."; "diese ganze Sammlung wird dermaleinst nur als Belag zur Geschichte der Physik dienen können." Ibid., 2:558–559.

[184] Arthur MacGregor, *Curiosity and Enlightenment: Collectors and Collections from the Sixteenth to the Nineteenth Century* (New Haven; London: Yale University Press, 2007), 227.

[185] "Rings um her laufen Mahagonyschränke voll der kostbarsten physikalischen Instrumente aller Art, die einst, bey der stets fortschreitenden Vervollkommnung, als Belege zu einer Geschichte der Physik werden dienen können." Niemeyer, *Beobachtungen auf Reisen in und außer Deutschland*, 3:151.

"Mr van Marum, whom I visited at his country house, shouldn't be blamed for withdrawing from the tedious business of showing people around, as many travelers have done. Who can demand of the man of science that he should go to the effort of entertain every inquisitive person? Unfriendly and disagreeable, as he has been made out, I didn't find him.

It may be true that the institute itself is, in light of the enormous amounts it has cost and still costs, more of a showpiece than a charity of public benefit. But should the public benefit be made into the only criterion of what is meritorious? The lectures on science held every winter, the treatises that have been published, even the numerous visits to such a rare collection, complemented by a second natural history cabinet, Mr van Marum's private property, and several other collections of the Society of Sciences founded earlier in Haarlem, have surely evoked many ideas in susceptible minds, and have in addition made visible many things, known only from descriptions. "[186]

Clearly, Niemeyer was making a balanced assessment.

Finally, the fact that Sierstorpff and Niemeyer already saw the scientific instruments as potentially more than just research tools within the setting of Teylers Museum is all the more striking in view of one final feature all known travel reports on Teylers Museum share: with the exception of just one, they all don't provide any detail concerning the museum's art collection.

Even the single exception is not very informative. It is provided by Samuel Ireland, in his book "A Picturesque Tour through Holland, Brabant, and part of France", detailing a journey he undertook in 1789. His declared interest were the paintings and painters of the regions he travelled through. Accordingly, he didn't mention Teylers Museum's scientific collections – all he in fact did was recommend the cabinet "formed by the late Mr. Teyler Vander Hulst, for the accommodation of young artists and connoisseurs in general".[187] Given that, as was mentioned before, a large part – if not even all – of Teyler's prints and drawings had been sold to van der Vinne early during the Foundation's history, this is not even a factually accurate statement.

Nevertheless, just one year later, the Foundation purchased a valuable collection of drawings which included works by famous artists such as Michelangelo, Rembrandt and Raphael. And just two months before van Marum passed away, the trustees decided to extend the museum's

[186] "Daß Herr van Marum, den ich auf seinem Landsitz besuchte, sich des lästigen Geschäfts des Herumführens überhebt, sollte ihm nicht, wie von manchem Reisenden geschehen ist, verübelt werden. Wer kann dem wissenschaftlichen Manne anmuthen, sich mit jedem Neugierigen abzuquälen? Unfreundlich und zurückstoßend, wie man ihn schilderte, habe ich ihn wenigstens nicht gefunden. // Daß das Institut selbst mehr ein Prachtstück, als, im Verhältnis des ungeheuren Aufwands den es gekostet hat und fortdauernd kostet, gemeinnützig ist, mag gegründet seyn. Aber soll man denn das Gemeinnützige zum einzigen Maaßstabe des Verdientlichen machen? Gewiß haben die in jedem Winter gehaltenen naturwissenschaftlichen Vorlesungen, die ans Licht getretenen Abhandlungen, selbst der häufige Besuch einer so seltnen Sammlung, der noch ein zweytes reiches Naturalienkabinett, das Privateigenthum des Herrn van Marum, und mehrere andre Sammlungen der in Haarlem schon früher gegründeten Gesellschaft der Wissenschaften, zur Seite stehen, in empfänglichen Geistern schon eine Menge von Ideen geweckt, auch daneben so vieles, was man nur aus Beschreibungen kannte, zur Anschauung gebracht." Ibid., 3:152.

[187] Samuel Ireland, *A Picturesque Tour through Holland, Brabant, and Part of France; Made in the Autumn of 1789*, vol. 1 (T. Egerton: London, 1796), 123.

premises. Crucially, the sole purpose of the new annex to the Oval Room was to display paintings the Foundation had started acquiring in the 1820s.

It is time to address this aspect of the history of Teylers Museum.

IV The Forgotten Art

1. No Great Connoisseur of Pictures

During his stay in Kassel in 1798 one of van Marum's new acquaintances there, a certain Mr. Traszychi from Poland, suggested they visit the "Bilder Galerie" together. Van Marum agreed, but Traszychi soon found himself alone at the gallery. As van Marum recorded in his travel diary:

"I left him there because, being a great connoisseur of pictures, he remained looking at many pictures longer than pleased me."[188]

Clearly, van Marum did not consider himself a "great connoisseur of pictures" – which is not to say that he did not appreciate the fine arts. The fact that he accompanied Traszychi in itself shows that he did. He was no philistine, and even records which paintings he liked in Kassel:

"I was specially attracted by two landscapes with cows by Potter, in one of which, a cow appears to be making water, and which specially bears the name of *La Vache qui pisse*, and by some pictures of flowers and fruit by Hussem."[189]

For all of his previous journeys his travel diaries reveal that he always took plenty of time to visit art galleries and churches, as well as scientific collections. Yet it is also perfectly clear that, throughout his entire life, van Marum's primary interest lay with the natural sciences. Indeed he was known to deride all other branches of science as "sciences de parlages".[190]

It is these clear priorities that go a long way towards explaining the relative lack of attention Teylers Museum's collection of fine art received during the first decades of the museum's history. Or, more accurately, why the museum appears to have been associated first and foremost with the natural sciences during this period. It is not that the art collections received no attention at all. On the contrary, the trustees saw to it that equal amounts of money were spent on prints and drawings as were spent on the scientific collections. But van Marum's activities and his forceful personality eclipsed everything else at the museum.

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[188] Marum, "Journey to Kassel, Göttingen, Gotha, Erfurt, Weimar and Jena in 1798," 281.
[189] Ibid.
[190] As quoted in: Mijnhardt, *Tot heil van 't menschdom: culturele genootschappen in Nederland, 1750-1815*, 323. The quote is taken from the recollections of H.W. Tydeman.

Van der Vinne's early departure can be seen as symbolic in this respect. Although his complaints were legitimate at least to some extent, van der Vinne and van Marum's disagreements bear all the characteristics of an "incompatibilité d'humeur". Van der Vinne's own behaviour seemed to suggest he was hoping to lead a comfortable life at the Foundation (recall he was loth to compile an inventory of Pieter Teyler's art work, for instance). This would not have chimed well with the energetic van Marum. What's more, van Marum's ambition of taking charge of the Foundation's collections was potentially at odds with Pieter Teyler's wording of his last will and testament, according to which van der Vinne had still been appointed, long before there was even any talk of a museum.

Yet van Marum's lack of interest in the fine arts was just as much a prerequisite for the successful cohabitation with the *kastelein* – who could, after all, not be dispensed with if Pieter Teyler's final wishes were to be respected. There are no signs of any conflict between van der Vinne's successor Wybrand Hendriks and van Marum. On the contrary, they cooperated repeatedly, with Hendriks supplying the images to van Marum's publications on the electrostatic generator for instance, or helping with the depictions van Marum sent to Faujas for the Frenchman's book on the fossils of Maastricht.[191]

It may have helped that van Marum's directorship was a fait accompli by the time Hendriks arrived at the Foundation House in 1785. What's more, although very little is known about this painter, the sporadic evidence that is available indicates that he was a jovial and gregarious character, who would most likely have known how to "handle" van Marum. J.H. van Borssum Buisman for instance wrote in 1972 (when he himself was *kastelein*): "There are still anecdotes that confirm the traditional account of his cheerful nature";[192] one of the very few letters to have been preserved by Hendriks' hand, containing an appeal to the Royal Institute to support a struggling artist who had come to him for help, is written with charm;[193] and the fact that many notables of Haarlem had their portrait painted by Hendriks over the years indicates that he was adept at assessing people's character.[194]

It would not do Hendriks justice to see him as inferior to van Marum, or as some sort of assistant to the director of the museum. Hendriks was an accomplished artist in his own right. He was one of the first to be elected a member of the Fourth Class of the Royal Institute for instance, and his talent as an artist was generally recognised.[195] And as far as the museum was concerned, Hendriks was regularly supplied with ample funds to acquire prints and drawings at auctions. When the Foundation´s financial fortunes improved in the late 1780s for instance, enabling van Marum to expand the instrument collection and travel to London, Hendriks too was provided with large amounts of money to expand the Foundation's collection of fine art.

[191] On Hendriks' depictions of the electrostatic generator see: Wiesenfeldt, "Politische Ikonographie von Wissenschaft: Die Abbildung von Teylers 'ungemein großer' Elektrisiermaschine, 1785/87." On his depictions of fossils from the Museum's collection see: Sliggers, "Krijtfossielen teruggevonden," 14.
[192] "Er zijn nog anecdotes die de overlevering van zijn vrolijke aard bevestigen"; Altena, Buisman, and Kops, *Wybrand Hendriks 1744-1831*, 13.
[193] W. Hendriks to C. Apostool, 27.11.1813, Haarlem, NHA, vol. 175, nr. 127. The same file contains another letter of his, in which he only thanks the Institute for electing him a member of its Fourth Class: W. Hendriks to C.S. Roos, 17.10.1809.
[194] On his activities as a portrait painter see: Altena, Buisman, and Kops, *Wybrand Hendriks 1744-1831*, 14–18.
[195] See: Ibid., 10.

Just as van Marum had returned from London in 1790 for example, Hendriks was granted the handsome sum of f3000,- "to be spent on Drawings, among them one Capital one at the sale of the Curiosities of the late Mr Jonas Witzen".[196]

2. Christina of Sweden's Collection of Drawings

By this time, the decision had long been taken to acquire what constitutes one of the most important acquisitions in the entire museum's history: the collection of prints and drawings formerly belonging to Christina of Sweden.[197] Although it was still to grow in value over the next two centuries, it was already a prize collection at the end of the 18th century, and included drawings by famous artists such as Michelangelo, Rembrandt, Raphael and Claude. The trustees paid a total of f10.000,- to be able to call this collection their own. (For comparison, they could have acquired two electrostatic generators for this money.) The collection was spotted by Willem Anne Lestevenon, a member of the Second Society who, fearing repercussions from his staunch support for the Patriots, had left for self-imposed exile in Italy after the House of Orange was restored to power in the Netherlands. He remained in correspondence with his compatriots who had remained in Haarlem, and first reported the collection was available in March 1789.[198]

(Incidentally, Lestevenon also reported he might be able to lay his hands on a collection of fossils, as well as anatomical wax models by Felice Fontana, and the trustees referred him to van Marum concerning these matters. The former medical doctor was definitely interested, and corresponded with Lestevenon about the possible purchase of all these items.[199] However, for unknown reasons, no deal was ever sealed. Nevertheless, it remains intriguing – but of course purely speculative – to entertain the idea of how the acquisition of Fontana wax models might have had an impact on the character of Teylers Museum, had it included such a prominent medical collection.)

Lestevenon was instructed to acquire Christina of Sweden's collection a few weeks later. The trustees arrived at the decision to purchase these drawings "after having consulted Mr Hendriks about the suitability of such a collection for the Museum".[200] Once the deal had been closed and the collection had found its way to Haarlem in 1790, Hendriks spent the next

[196] "te besteden aan Tekeningen waaronder ééne Capitale op de Verkopinge der Liefhebberijen van wijlen de Heer Jonas Witzen"; "Directienotulen", 13.08.1790, Haarlem, ATS, vol. 5.
[197] On the history of this collection, the veracity of the claim that it once belonged to Christina of Sweden, its peregrinations and its acquisition by the Teyler Foundation see: Carel van Tuyll van Serooskerken, *The Italian Drawings of the Fifteenth and Sixteenth Centuries in the Teyler Museum* (Haarlem; Ghent; Doornspijk: Teylers Museum, 2000), 22.
[198] "Directienotulen", 13.03.1789, Haarlem, ATS, vol. 5.
[199] For translations of the relevant letters see vol. 6 of: Lefebvre, Bruijn, and Forbes, 197–219.
[200] "na den Her Hendriks geraadpleegt te hebben over de geschiktheid van zodanige Verzamelinge voor het Musaeum"; "Directienotulen", 29.05.1789, Haarlem, ATS, vol. 5.

two years sorting and "restoring" these drawings and placing them in specially made folders.[201]

Where exactly they would have then been kept is not clear. Most likely in the flat-top cabinet in the Oval Room. Either way, they and the other prints and drawings from the museum's collection would not have been displayed prominently, simply because that would not have been deemed adequate storage for this type of art. This, in turn, provides another reason why the art collections were initially eclipsed, despite their high quality: beside the expansive scientific instruments and glittering minerals, they would not exactly have constituted eye-catchers. In addition to this, they were at least as fragile as the instruments, and it would have been a burden for the manservant showing visitors around the museum to take these works of art out of their folders and show them to visitors.

Interestingly, early during the museum's history the idea of creating a cabinet of art in an adjacent building was launched, yet not implemented. In June 1786 the tenants of the house next to the Foundation House appear to have moved out, because the trustees decided not to put it on the market again. One of the reasons for this decision was that it would have needed a complete and costly overhaul to make it "habitable for respectable people". But, more importantly, the trustees also decided against renting out the house "because an, at the moment admittedly distant, aim of the Trustees always remains to bring together in this House a Cabinet of Paintings, or to employ this house for some other purpose for the benefit of this Foundation".[202] In all likelihood this house was where van Marum's chemical laboratory was installed four years later.

3. Changing Definitions of "Art"

The plans for a cabinet of paintings seem to have then been shelved, for they are not mentioned again for the next decades. They actually only resurface after Wybrand Hendriks had resigned from his post because of old age in 1819. He was succeeded by Gerrit Jan Michaëlis, another painter, who moved to Haarlem from Amsterdam.

By the time Michaëlis was appointed as *kastelein* by the Foundation, the world of fine art had undergone a profound transformation. This was the result of a variety of complex and interconnected developments, the roots of which often lie in far earlier periods of history, and the effects of which only came to the fore far later, in the second half of the 19th century. The causes underlying these historical processes are hard to pinpoint, in fact it is often impossible to distinguish between the causes and the effects of these developments. For the purposes of

[201] Altena, Buisman, and Kops, *Wybrand Hendriks 1744-1831*, 13.
[202] "voor fatzoenlijke Lieden bewoonbaar"; "alzo steeds een, schoon thans nog ver afgelegen oogmerk bij Directeuren blijft stand houden, om in dit Huis een Cabinet van Schilderijen bijeentebrengen, of hetzelve huis tot eenig ander einde ten dienste deezer Fundatie te emploieeren"; "Directienotulen", 16.06.1786, Haarlem, ATS, vol. 5.

this study, a brief and ultimately no more than superficial sketch of the outlines of the developments surrounding the transformation of the art world around 1800 will therefore have to suffice.

In the most general of terms, what was happening was that "art" was increasingly equated with "fine art" – painting in particular – and was ever more frequently pitted against "science". The origins of a dichotomy that came to dominate the cultural world throughout the 20th century can be perceived, with on the one hand "art" being associated with an individual's creative, imaginative, unpredictable, irreproducible travails, and on the other hand "science" carrying connotations of sober, disinterested, methodologically plodding yet highly complex and programmatic work. Lorraine Daston has studied the status of the "imagination" in the intellectual landscape. "Between about 1780 and 1820", she summarises, "[p]ut in the briefest of terms, facts hardened, the imagination ran riot, and art and science diverged in their aims and in their collective personae".[203]

These developments were clearly felt in the Netherlands too, and are not just an "after the fact" assessment by historians. In 1809, for instance, Johan Meerman, who at the time carried the title of "Director-General of the Sciences and Arts" in the Kingdom of the Netherlands (the Emperor Napoleon's younger brother Louis had been crowned king in 1806), made the following appeal in a speech during which the King himself was present:

"One errs greatly, if one views the fine arts only as a luxury of a people. They are closely connected with national prosperity, they are in particular linked with the promotion and the splendour of the factories, and with a number of the sciences; *and to pay tribute to the latter, while despising and rejecting the former would be nothing but to want to tear two inseparable things apart* [emphasis MW], and to deprive the sciences of what in so many respects not only may serve to their adornment, but even to their elucidation and development, and sometimes to disfigure them to a withered and ungainly body."[204]

Just as interesting as the statement itself is the context within which it was made: Meerman was speaking at the presentation of the "Royal Prize of Painting and Etching", which was presented at the town hall of Amsterdam, where all the contestants' works were exhibited in a public art show. This serves to illustrate three crucial points. Firstly, the government (the King) was trying to impose a sense of taste on his subjects (i.e. "the public") by stimulating and encouraging the production of a particular kind of fine art (whatever was eligible for and won the prize). This marks a shift away from the formative role of private patronage in the art

[203] Lorraine Daston, "Fear & Loathing of the Imagination in Science," *Daedalus* 134, no. 4 (2005): 22.

[204] "Men dwaalt ten zeersten, wanneer men de schoone kunsten alleenlijk als den luxe van een volk beschouwt. Zij staan met den geheelen nationaalen voorspoed, zij staan inzonderheid met de bevordering en den luister der fabrijken, en met eene reeks van wetenschappen in het naauwste verband; *en aan deeze te willen hulde doen, met minachting en verwerping van geene, zou niet anders zijn, dan twee onafscheidelijke dingen van één te willen scheuren* [emphasis MW], en de wetenschappen van 't geen in zoo veel opzigten tot haar cieraad niet alleen, maar zelfs tot haare opheldering en ontwikkeling strekken kan, te beroven, en somwijlen haar tot een dor en onbevallig ligchaam te misvormen." Johan Meerman, *Aanspraak van den Directeur-Generaal der Weetenschappen en Kunsten, bij de uitdeeling der koninklijke prijzen van schilder- en graveerkunst, op het Raadhuis te Amsterdam, den 18 van herfstmaand 1809: voorafgegaan door deszelfs rapport aan Zijne Majesteit, wegens de ten toon stelling des voorigen jaars en de toewijzing der prijzen* (Amsterdam; 's-Gravenhage: Gebroeders Van Cleef, 1809), 6–7.

world, towards the formative role of a government's cultural policy. Secondly, this example serves to illustrate how public art exhibitions were emerging as cultural policy tools. The exhibition in the town hall sought to attract visitors and imbue them with a certain message. Thirdly, it is indicative of the growing importance of "the public" – in the sense of large crowds – in the art world, and also how, on various levels, the general public was rapidly becoming at least as important as individual rich patrons.

With regard to the third point, it is important to realise that the changing composition of the art world coincided with profound changes in the art market. These changes are epitomised in the abolishment of painters' guilds. In the Netherlands, this happened in 1798. Their dissolution needs to be seen as the culmination of long-standing developments, and in the Netherlands did not constitute as much of a rupture with the past as it did in other countries, because it had a long tradition of a thriving and comparatively free art market – despite his "superstar" status even amongst contemporaries, Rembrandt for instance had notoriously spent the final years of his life in poverty because he had never become a member of a guild. Nevertheless, with the dawn of the 19th century, painters and other fine artists saw themselves forced to cater to the markets, i.e. "the public", in order to guarantee a sustainable livelihood. This in turn had an impact on the way they defined their profession, and how they saw fit to fashion themselves within the market. In the long term, this contributed to the inimitability of their work being emphasised, and everything that inimitability entailed. By the end of the 19th century, painters in the Netherlands were therefore increasingly eager to be labelled bohemian.[205]

4. Paintings by Contemporary Artists

On a more immediate level, in the aftermath of the abolishment of guilds and the increasing involvement of the government in cultural matters, the first decades of the 19th century saw a booming expansion of the market for contemporary paintings.[206] All over Europe, whoever had the money bought modern paintings, and whoever had the time saw to it that he hobnobbed with other connoisseurs of the arts at public exhibitions. This was reflected in the birth of a new literary genre: that of art criticism. It can be taken to have arisen from the confluence of art history and aesthetic theories of taste, both of which began to be

[205] 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.

[206] Annemieke Hoogenboom, *De stand des kunstenaars: de positie van kunstschilders in Nederland in de eerste helft van de negentiende eeuw* (Leiden: Primavera Pers, 1993), 139; Francis Haskell, *The Ephemeral Museum: Old Master Paintings and the Rise of the Art Exhibition* (New Haven; London: Yale University Press, 2000), 67–68.

systematically developed in the 18th century.[207] In the Netherlands, prominent art critics began to establish a reputation and a following after the Restoration.[208]

Given that it was highly fashionable to buy and collect contemporary paintings during the second quarter of the 19th century, it must not come as too much of a surprise that the trustees' plans for a cabinet of paintings, last mentioned in 1786, resurfaced during this period. This was prompted by the acquisition of just such paintings after 1824.[209] Reasons as to why the decision was taken to purchase such works of art are not recorded. One can be sure, however, that the new *kastelein*, Michaëlis, was involved in this decision. To what extent however, again remains a mystery.

As does, in fact, the man himself. Very few traces that would reveal anything about his life or his interests can be found in the archives.[210] The only direct form of evidence that indicates he was intimately involved in the acquisition of paintings comes from the diary of Adriaan van der Willigen, a prominent writer, critic, civil servant and member of Teylers Second Society. He lamented that the members of the Second Society were never involved in the purchase of new paintings and elaborated:

"It is mainly if not only the Director, Mr W. van der Vlugt, who acts in this respect, availing himself of the services of the caretaker and superintendent of paintings, drawings and prints, Michaelis, when he, as the director, approves of it."[211]

The choice of paintings indeed does not appear to have followed any particular system. As far as discernible, the trustees' personal taste – or perhaps only van der Vlugt's and Michaëlis's – formed the guiding principle.

What was ultimately more important though, was the fact that paintings were being acquired on a large scale at all – the crucial point being that paintings, unlike prints and drawings, need to be hung in order to be appreciated properly. As the collection of paintings was expanded, it was therefore essentially only a matter of time before adequate premises became desirable, and all the more so because the Oval Room is not in any way suited to hang paintings. The first such opportunity presented itself in the 1820s.

In 1824, the board of trustees of Teylers Foundation took the decision to add a first annex to the Oval Room.[212] Detailed reasons are not provided. This annex was complete two years later, and it consisted of two stories, each with a large room. As was already mentioned

[207] See for instance: Regine Prange, *Die Geburt der Kunstgeschichte: Philosophische Ästhetik und empirische Wissenschaft* (Köln: Deubner, 2004), 28–36.
[208] 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), 50–68.
[209] Annemiek Ouwerkerk, *Romantiek aan het Spaarne: schilderijen tot 1850 uit de collectie van Teylers Museum Haarlem* (Haarlem: Teylers Museum, 2010), 25–27.
[210] Catherine de Jong, "Gerrit Jan Michaëlis: Beperkingen En Vrijheden van Een Kastelein in Het Teylers Museum" (bachelor thesis, Utrecht University, 2011).
[211] "Het is hoofdzakelijk zoo niet alleen de heer directeur W. van der Vlugt, die in dit opzigt handelt, zich bedienende van den concierge en opzigter der schilderijen, teekeningen en prenten, Michaelis, waneer hij directeur zulks goedvint." As quoted in: Sliggers, "De kwalen van Van Marum: uit het dagboek van Adriaan van der Willigen (1831-1839)," 8.
[212] "Directienotulen", 09.04.1824, Haarlem, ATS, vol. 7.

before, one part of this building – the first floor – was furbished as a reading room for the library, which was then opened to the public. Two years later the room below on the ground floor however was still empty. One can only make an uneducated guess as to what had already been discussed in the meantime, but in 1828 the trustees must have decided to finish off what they had begun, as they sent a letter to the members of the Learned Societies in an attempt to garner support for the trustees' plan of furnishing the empty room as a small lecture theatre (i.e. something of a seminar room). The idea was that once a year every member of the Societies could and should give a short presentation on the results of whatever research he had been devoting his time to for the other members and the trustees.[213]

However, to cut a long story short, the trustees failed to gain enough support for their plans. Despite their repeated efforts, only four out of the twelve members of the Societies agreed to give annual lectures. (One can be sure that one of these was van Marum.) Incidentally, in one revealing passage, the trustees stated quite clearly how they saw the museum's collections, and whom they should serve. They stated that with the auditorium they hoped

"…to show to the educated world, that Teylers Foundation not only has hidden treasure in its rich collections, but that the Members of its Societies feel amply capable of using these treasures in a way that is appropriate, and useful and beneficial for the promotion of the Arts and Sciences".[214]

In other words, "the public" was essentially equated with "the educated world".

As far as the paintings were concerned however, the outcome of this exchange of letters was more important – and, perhaps ironically, was ultimately a major prerequisite on the way to Teylers Museum becoming a "public" museum in the sense of being explicitly intended to be accessible to a larger and more diverse segment of the population in later years. More to the point, the trustees decided to exhibit their newly acquired collection of contemporary paintings in the room in question. Interestingly, the visitor's books now regularly contained more than 400 signatures per year.[215]

Van Marum was not enamoured with the trustees' decision, and would clearly have preferred the room to be used for public lectures. In an addendum to his recollections he noted that the ground floor of the new annex was now used as a "place for the display of Paintings of living Dutch masters, which have been bought by the Trustees since 1825 for considerable sums."[216] He struck out some further comments which clearly reveal he would have preferred a

[213] On this exchange of letters see: Kersten, "Een schilderijenzaal of een gehoorzaal."
[214] "…aan de geleerde wereld te toonen, dat Teylers Stichting niet slechts verborgene schatten in hare rijke verzamelingen bezit, maar dat de Leden van dezelver Genootschappen zich ruimschoots in staat gevoelen, om van die schatten een doelmatig, en aan der Kunsten en Wetenschappen bevordering, nuttig en heilzaam gebruik te maken"; as quoted in: Ibid., 11.
[215] For the visitor's book for the years 1827-1836 see: "Album van Teylers Museum", 1827-1836, Haarlem, ATS, vol. 151.
[216] "vertoonplaats van Schilderijen van levende Nederlandsche meesters, welke door Directeuren, sedert het jaar 1825 tot aanzienlijke prijzen zijn aangekocht." Martinus van Marum: "De Geschiedenis van de oprigting van Teyler's Museum", 1823-1833, Haarlem, NHA, Archief van Marum, vol. 529, nr. 9, fol. 146.

different solution, complaining that the room "will be hung with precious paintings, and as a result be made entirely unsuited for having Physical lectures in it".[217]

The trustees, however, evidently took a liking to this exhibition of their paintings. Less than ten years later, and just two months before van Marum passed away, they took the decision to build a new annex to the museum, which was completed in 1839.[218] Crucially, the sole purpose of this new extension to the premises was to exhibit the Foundation's collection of fine art. In fact, the entire character of the museum changed once this new exhibition area had been completed, simply because it was roughly equal in size to the Oval Room, yet its sole purpose was the aesthetic contemplation of works of fine art – it did not contain as much as a trace of any scientific experiment or research.

As a result, Teylers Museum gradually began to gain a new function, as a public art museum – without, however, losing its function as a place of research, rooted in its initial role as the repository to Teylers Learned Societies. The increasing importance of Teylers Museum's role as a public museum and how its hybridity began to lead to tensions is the topic of the next chapter.

[217] "met kostbare schilderijen zal worden behangen, en hierdoor, voor het houden van Physische lessen in dezelve geheel ongeschikt zal worden gemaakt"; Ibid., fol. 147-148.
[218] On the decision see: "Directienotulen", 20.10.1837, Haarlem, ATS, vol. 8. As usual, detailed reasons were not given, although inadequate lighting and space is referred to. In addition to this the fact that the initial exhibition room was inadequate for the preservation of the paintings may have played a role as well. In 1831 special cases had been constructed for the prints and drawings to shield them from the damp. See "Directienotulen", 25.11.1831, Haarlem, ATS, vol. 8.