

Patriotism, professionalization and personal development

Conflicting visions of science in Dutch scientific societies, 1752-1900

Master's thesis



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Abbreviations

PUG	:	Provinciaal Utrechtsch Genootschap voor Kunsten en Wetenschappen
HMW	:	Hollandsche Maatschappij der Wetenschappen
KNAW	:	Koninklijke Nederlandse Academie van Wetenschappen
UA	:	Utrechts Archief
NHA	:	Noord-Hollands Archief

Introduction

Prima mali labes a Philosophia Cartesiana, quae stultae juventuti & novitatis avidae, bonos libros excussit e manibus. Inde ad Experimenta ventum est; in quibus nunc omnis cruditio, omnis sapientia collocatur. Reales se vocant, specioso nomine, homines astuti: caeteros, quorumque literarum genere celebres, Verbales, & Notionales, ad contemptim.

M. Casaubon, *Epistola XVI* (1668)¹

Le règne des lettres est passé; les physiciens remplacent les poètes et les romanciers; la machine électrique tient lieu d'une pièce de theatre.

Louis-Sebastien Mercier, *Tableau de Paris* (1780)²

In retrospect, the rise of Cartesianism can be seen as the beginning of the modern exact sciences. As the quotes show, this new methodology and its adherents were immediately seen as a threat to the more traditional philological and literary sciences. Casaubon and Mercier perceived a division into two tracks, of which the new science clearly carried more prestige. The danger in taking these testimonies at face value, however, is that we construct a narrative where the rise of the natural sciences becomes an inevitable process, mirrored by the slow but inexorable decline of other disciplines. Also implicitly present is the idea that the Cartesian and philological methods are two completely different approaches that share little or nothing.

And indeed in our own times, these complaints are, if anything, more widespread. For example, in 1959 the novelist and physical chemist C.P. Snow sparked a debate about the high degree of specialization and the lack of communication that had come to characterize science. The now famous lecture – *The Two Cultures* – argued that there exists a mutual incomprehension between practitioners of the natural sciences and those active in literature, concluding: “There seems then to be no place where the cultures meet.”³ In fact, such places

¹ M. Casaubon, *Epistolae*, in: I. Casaubon, *Epistolae*, ed by Th. Jansonius van Almeloveen (Rotterdam, 1709), 23-24. ([The first evils] came from the Cartesian philosophy, which knocked the good books out of the hands of the young, who are foolish and desire novelty. Then one passed on to ‘Experiments,’ where all learning and all wisdom are now located. These clever men call themselves “Realists,” an attractive title; the rest, whatever sort of literature they are distinguished for, are dismissed as ‘Verbal’ and ‘Idealist’.” Translation A. Grafton, *Defenders of the Text: The Traditions of Scholarship in an Age of Science, 1450-1800* (Cambridge, MA: Harvard University Press, 1991), 3.

² L.S. Mercier, *Tableau de Paris*, vol. XI (Paris, 1780), 18.

³ C.P. Snow, *The Two Cultures, and: A Second Look, an Expanded Version of the Two Cultures and the Scientific Revolution* (Cambridge: Cambridge University Press, 1964), 16. Some (critical) reflections on this work can be found in W.W. Mijnhardt and B. Theunissen. *De twee culturen. De eenheid van kennis en haar*

had existed for ages in the European learned and scientific community in the form of scientific societies, some of which still exist. Many historians have pointed out how in the early modern period science formed a unity and there are numerous examples of scholars engaging in multiple disciplines in a fashion unthinkable in present times.

The work of historians like Anthony Grafton on the great humanist scholars of early modern Europe amply bears out the very different nature of knowledge, science and scholarship in earlier times. It is simply incorrect to view the emergence of the New Science as coinciding with the demise of humanism, as if the one necessarily entails the other. It is far more accurate to say that these two genres co-existed for a long time: “Humanism remained a rich and vital – though also a varied and embattled – tradition for at least two centuries after the end of the Renaissance.”⁴ In short, if Snow’s opinion about the two cultures applies to British academic life around 1960, it certainly does not do so for long stretches of European intellectual history, as Grafton argues: “The two cultures, in short, were not locked in the battle that the pamphleteers of the New Philosophy called for; they coexisted and often collaborated, and sometimes the scientists proved to be better readers of texts than their scholarly friends.”⁵ It is of course true that gradually the disciplines began to take more distinct shapes, and the Republic of Letters underwent a process of intellectual enclosure: “Les orientations nouvelles qui se firent jour au milieu du XVII^e siècle et les transformations institutionnelles qui en sont issues (academies, sociétés savantes et journaux) allèrent de pair avec une ‘compartimentalisation’ du savoir”.⁶ But we should not project the extent of that compartmentalization back in time and assume that the emergence of (new names for) new disciplines meant the growing isolation of, and lack of contact between, scholars and scientists as it exists today.

Important theoretical contributions to this narrative of a deep rift within the sciences were made by Dilthey and Windelband in the late nineteenth century. Dilthey introduced his famous distinction between explanation and understanding (*erklären* and *verstehen*, respectively), the former being the task of the natural sciences and the latter applicable to the human sciences. Windelband introduced a distinction based on methodology: in his view the natural sciences were nomothetic, i.e. looking for the general and law-like in nature, whereas

teloorgang (Amsterdam: Rodopi, 1988). In general, Snow’s rather superficial essay is important more for the debate it created than for its inherent quality. The majority of the lecture is concerned more with the state of British education and its problematical backwardness in the context of the Cold War than with analysing the origins and character of modern science.

⁴ Grafton, *Defenders of the Text*, 4.

⁵ *Ibidem*, 5.

⁶ Hans Bots and Françoise Waquet, *La République des Lettres* (Paris: Belin-De Boeck, 1997), 50.

the human sciences were idiographic, i.e. interested in the individual and unique. This distinction was overly schematic: many of the humanities are actually searching for patterns and generalizations, as Rens Bod has recently argued, showing that some of the formal methods and patterns found in the humanities have been applied successfully within the natural sciences.⁷ Conversely, it is far from uncommon for scientists in one of the natural sciences to investigate unique and individual cases. In general, knowledge can be split into many dichotomies: distinctions based on subject-matter (nature vs. mind), method (experiment vs. observation), result (quantitative vs. qualitative) are just some of the possibilities with which one can attempt to paint a neat picture of the difference between natural and human sciences, at least under the doubtful assumption that such a clear distinction exists. As two historians, writing on the relatively new field of the history of the humanities aptly conclude, “our concept of the sciences implies boundaries that do not reach back very far in time.”⁸

In general, the history of science over the last couple of decades can be seen to a large extent as a body of work where many of the allegedly unique features of science have been debunked: we are now well aware that many of the leading figures of the Scientific Revolution were very active in fields that few modern scientists would want to be associated with. To project modern disciplines back in time inevitably leads to major anachronism and distortion. Historians have also come to realize that scientific practices, such as observation and experiment, often took place outside the laboratory or university, and that those practices were not just the prerogative of university professors in the traditional disciplines, but that engineers, artisans, merchants and others also engaged in them.⁹ And where can we draw the line between science and other forms of knowledge and expertise? Studies on non-Western cultures show that these distinctions are not evident either.¹⁰

⁷ Some examples can be found in Rens Bod, “A Comparative Framework for Studying the Histories of the Humanities and Science”, *Isis* 106(2) (2015), 367-377.

⁸ Rens Bod and Julia Kursell, “Introduction: The Humanities and the Sciences”, *Isis* 106(2) (2015), 338. Rens Bod and James Turner are key names in this new field. See for the most important literature: Rens Bod, *Vergeten wetenschappen: een geschiedenis van de humaniora* (Amsterdam: Bakker, 2010) and the English edition: *Ibid., A New History of the Humanities: The Search for Principles and Patterns from Antiquity to the Present* (Oxford: Oxford University Press, 2013); Rens Bod, Jaap Maat, and Thijs Weststeijn (eds.), *The Making of the Humanities*, 3 vols. (Amsterdam: Amsterdam Univ. Press, 2010–2014). Vol. 1: *Early Modern Europe* (2010), Vol. 2: *From Early Modern to Modern Disciplines* (2012), and Vol. 3: *The Modern Humanities* (2014); James Turner, *Philology: The Forgotten Origins of the Modern Humanities* (Princeton: Princeton University Press, 2014); See also the articles in *Isis* 106(2) (2015).

⁹ See for example Pamela H. Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago: The University of Chicago Press, 2004) and Pamela H. Smith and Benjamin Schmidt (eds.), *Making Knowledge in Early Modern Europe: Practices, Objects, and Texts, 1400-1800* (Chicago: University of Chicago Press, 2007).

¹⁰ Lorraine Daston and Glenn W. Most, “History of Science and History of Philologies”, *Isis* 106(2) (2015), 382.

Still, if one compares the situation around 1900 with earlier humanist ideas, it is obvious that a fundamental change had occurred. One might sketch the two views broadly like this, keeping in mind that these are abstractions, and that my research wants to contribute to studying the extent to which these traditions have co-existed and influenced each other. As the *terminus a quo* we might describe *the humanistic view* thus: The pursuit of knowledge and science is considered to be a moral good, which leads to the perfection of the individual and the improvement of society. These ideals can be found in many early modern literary societies, e.g. the Rhetoricians in the Dutch context who were amateurs interested in a very broad education: starting from a refinement of linguistic skills, they also aimed to acquire knowledge in many fields, wisdom and religious insight.¹¹ There was a pedagogical program with an all-encompassing vision which saw knowledge, science, the (fine and mechanical) arts, and morality as indissolubly linked to each other. Similar conceptions can be found in early French academies about which Frances Yates has written.¹² She emphasizes the Neoplatonic influence, but the ideas about the connections of morality and knowledge, the gradual ascent through the disciplines, the links between them, are all ideas that can be found in this context as well. Part of the political and social background that can explain the emphasis on unity and the attempts at creating harmony can be found in the religious wars and conflicts of the early modern period.¹³ A final premise of the humanists was that collecting and juxtaposing different disciplines, whether in academies or encyclopaedias, leads to mutual illumination.

In contrast, the *terminus ad quem* toward which we move is *professional science*. Beginning with Descartes and the Scientific Revolution one encounters the idea that humanism does not lead to real knowledge and that there is a privileged sort of knowledge, reached by employing a specific (mathematical) method which is the only way to certain knowledge. Ultimately, the product of this is the idea, around 1900, that science is a set of disciplines, a scientist is a *professional*, i.e. someone who communicates his results first and foremost to his colleagues rather than to society at large, and a *specialist*, i.e. someone with a narrow range of expertise who does generally not engage, at least professionally, in other disciplines. As a consequence, knowledge becomes a privileged good, not accessible to anyone but a small circle of specialists: only they really possess knowledge. In addition to

¹¹ See e.g. Arjan van Dixhoorn, *Lustige geesten. Rederijkers en hun kamers in het publieke leven van de Noordelijke Nederlanden in de vijftiende, zestiende en zeventiende eeuw* (s.l., s.n., 2004) and the other works by Van Dixhoorn cited in the bibliography.

¹² Frances Yates, *The French Academies of the Sixteenth Century* (London/New York: Routledge, 1988 [1947]).

¹³ See Gerhard Kanthak, *Die Akademiegedanke zwischen utopischem Entwurf und barocker Projektmacherei: zur Geistesgeschichte der Akademiesbewegung des 17. Jahrhundert* (Berlin: Duncker und Humblot, 1987).

that, the scientist is supposed to be able to separate his professional work from any political convictions or religious beliefs he may have. Science is not usually described in moral terms anymore: it is the pure search for knowledge, or else the technical application of that knowledge, but not something that *eo ipso* makes its practitioner a better person. Science is now seen as a secular process that aims at increasing our knowledge, and (either directly or indirectly) promotes progress, which is usually understood in a material sense. In other words, the task of science becomes much more restricted, as does the number of its practitioners.¹⁴

Project and questions

All of this makes it all the more important to study how knowledge, science (and scientific disciplines) have been conceptualized historically. We have to study how our contemporary notions of science have been shaped, how conceptions of science and knowledge have changed over time, what different approaches have been taken, what different ways of demarcating disciplines have been applied, etc. What has become increasingly clear in recent years is that, for one thing, science was much less specialized than it is now. For another, it was much less the business of a closed group of professionals, but also had many participants whom we would now call ‘amateurs’. Finally, science had a strong moral, political and patriotic undertone. Keeping in mind that science looked very different around, say, 1750, and that there was nothing natural or inevitable about the subsequent developments towards contemporary science, important questions arise: how exactly did science develop? To what extent did older forms and practices live on? Can we point to decisive changes? And if so, how did they come about? These questions are broad, and can only be studied here in one particular case, that of Dutch learned societies. Hedged in between the world of the Republic of Letters and that of the modern research university, the scientific societies form a unique institutional episode in the history of science. The main question of my research will therefore be: To what extent did the scientific society as an institution lead to a unique conception of science? Special emphasis will be put on the fact that we find different conceptions of science in the learned societies that to some extent are in conflict with each other. These are the vision of science as a utilitarian activity aimed at benefiting the nation, the vision of science as a professional activity, and the humanistic vision of science in which personal development is so important. To answer my main question, three sub-questions will play an important part:

¹⁴ A more detailed outline of these developments can be found in the first chapter.

- (1) *What* is science? Which explicit or implicit definitions and characteristics can we find? Which topics and disciplines are studied most? And how does this change over time?
- (2) *Why* was science practised? In other words: what is the function of science according to the learned societies? Is science supposed to be applied or pure research? To what extent is state service an issue?
- (3) *Who* were active in the learned societies, and can we detect changes in the status of the average member (professional, educational, social, or otherwise)?

Why choose scientific societies as the place to study the big developments sketched above? If we think of science, the association with universities is inevitable. However, for the majority of their history, universities have functioned first and foremost as training grounds for generations of theologians, lawyers and doctors. Research was often conducted outside the university, such as in the many learned societies that were founded in early modern Europe. I have chosen to focus on scientific or learned societies because they often were meeting places for scholars of many different orientations and produced a lot of contact and debate between them. In the substantial archives of those societies, a lot of material can be found that can shed a light on the practice of scientific research, more so than if we look at the university, which only became more important in a research capacity towards the end of the nineteenth century.

Method and sources

There were many scientific societies in Europe, and even a small country such as the Netherlands had a number of general societies, besides many more specialized ones.¹⁵ For reasons of time and space I have to limit myself to two of these Dutch societies: the *Hollandsche Maatschappij der Wetenschappen* (hereafter HMW) and the *Provinciaal Utrechtsch Genootschap van Kunsten en Wetenschappen* (hereafter PUG). The choice for the HMW is justified by the fact that it is the earliest example of a scientific society in the Netherlands, founded in 1752, allowing us a longer look at eighteenth-century science than any other society: until 1769 it was the only Dutch scientific society, and until the founding of the Koninklijk Instituut (which would evolve into the KNAW) in 1808 it was certainly the most important one. In addition to that, it was one of the few truly national societies. Located in Haarlem, it had members from all over the country, whereas many societies had a more

¹⁵ A more detailed overview of Dutch learned societies and their historiography can be found in the second chapter.

local orientation. Studying the PUG (founded in 1773) is interesting for its location in Utrecht, where one of the major Dutch universities was located, many of whose professors became members of the PUG, allowing us to study the relation and mutual influence of the society and the university. Furthermore, the PUG was one of the few scientific societies to maintain its very broad profile of interests and disciplines throughout the nineteenth century, in the face of a changing scientific landscape. How the PUG negotiated these changes will be part of my research.

In addition, choosing these two societies is motivated by the relative lack of historiography on them, and hopefully this project will be a contribution to their history. One of the other possible societies of truly national scope to be included here is the *Koninklijke Academie van Wetenschappen* (KNAW) and its earlier forms, but relatively much has been written on it lately, making it less urgent to contribute to its history here.¹⁶ For the HMW and PUG, general histories have not been written recently. Indeed, the only major overviews we have, are the histories written by secretaries of those societies on the occasion of their 200th (HMW, 1952) and 150th (PUG, 1923) birthdays.¹⁷

The archives of these societies are extensive, and cannot be studied in their entirety. One could choose to focus on speeches made in the yearly meetings, or the way the societies presented themselves to the outside world. The problem with those sources is that their rhetorical nature makes them harder to interpret, and do not allow us to get at the real beliefs and practices of the members on a day-to-day basis. The approach I have chosen therefore focusses on one of the central activities of many societies: the prize contests. Each year a number of questions would be issued, and the best entry would win a gold (or silver) medal. In order to judge if the entries were worth a prize, the essays were circulated among a number of judges (usually three) who were members of the societies. These ‘jury reports’ give us a more direct look into the actual beliefs and practices of the societies. In addition, they form a continuous and uninterrupted series for the entire period we are investigating here, so they can serve the purpose of tracking continuities and developments.

Finally, a note on terminology. Since the term science in the English-speaking world has a smaller connotation than *wetenschap* and *Wissenschaft*, it can lead to some confusion to use this word. Science in the English world denotes the natural or exact sciences and does not

¹⁶ E.g. Klaas van Berkel, *De stem van de wetenschap : geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*. Volume I, 1808-1914 (Amsterdam: Bakker, 2008). In addition, the KNAW has sponsored a series of publications about its own history recently, which neither HMW nor PUG has ever done.

¹⁷ J.A. Bierens de Haan, *De Hollandsche Maatschappij der Wetenschappen, 1752-1952* (Haarlem: s.n., 1952); N.J. Singels, *Uit de geschiedenis van het P.U.G. (Provinciaal Utrechtsch Genootschap), 1773-1923* (Utrecht: Oosthoek, 1923).

usually include the humanities and the social sciences. One of the major conclusions to emerge from a study of scientific societies will however be that those distinctions made much less sense in earlier ages and were indeed a source of considerable debate. If I use the word science here, it should therefore be kept in mind that, more often than not, this does not refer to the natural sciences exclusively. Similarly, the term scientist was only coined in 1840, but is used here interchangeably with scholar and does not necessarily refer to a physicist, chemist, or other natural scientist.

Outline

Since one of the purposes of this research is to investigate the continuing influence of older, humanist traditions of learning, the first chapter will sketch (in a highly impressionistic manner) the character of humanist and encyclopaedist ideals of knowledge and learning. The second chapter will provide more background to the world of learned societies in Europe and especially the Netherlands. In the third and fourth chapters the actual research into the prize contests will be presented for the HMW and PUG respectively. These chapters form the core of this thesis, and those already familiar with the historiography and background may skip the first two chapters.

Chapter One - Science, learning, and knowledge in the early modern period

As mentioned in the introduction, early modern scientific practices and ideas about learning were very different from the ones we have come to be accustomed with. What stands out especially, is the breadth of learning and the scope of topics that could be handled by a single scholar. Just as striking to a contemporary observer is the fact that many of the men active in the world of learning, did so ‘on the side’, whilst being engaged in what seem to be full-time professions, ranging from lawyers and physicians to artisans, although we should also include the numerous aristocrats with too much time on their hands and apparently no interest in hunting. This picture needs to be developed more fully if we are to appreciate the influence of these knowledge ideals and their fate in subsequent ages. Obviously, a more developed picture is all I intend here. Given the size of the literature on humanism, it would be impossible for almost anybody to give a full overview, let alone a non-specialist in the field such as myself. Drawing on a select body of secondary literature, I want to present what I think are a few salient points present in the practices and ideals of humanism, and the related practices of dictionary- and encyclopaedia-writing (or, more accurately, -compiling) that can serve as a point of comparison to the eighteenth- and nineteenth-century practices in the Dutch societies.

1.1 Humanism

Humanism is often misrepresented as a movement with an exclusively textual focus and an interest in the past without any regard for (making these texts relevant to) the present. As Anthony Grafton argues, this picture is the result of a successful framing campaign by the advocates of the new, Cartesian science. Although a strong interest in the classics is a key element of humanism, it is inaccurate to project a modern distinction between science and the humanities back in time. Kepler is a case in point: a figure who usually takes a prominent place in histories of science, he was also an accomplished interpreter of astronomical references in ancient texts, an expert on Ptolemy’s *Almagest*, and he used his astronomical expertise to date events in old sources. In doing this, Kepler proved “himself the master of both cultures – or else, perhaps, [...] their basic unity.”¹⁸ Nor is it true that the majority of humanists had no interest in the present: someone like Justus Lipsius stressed the need to make the classics meaningful to the present, and he did this by his application of Stoicism to

¹⁸ Grafton, *Defenders of the Text*, 191.

contemporary life.¹⁹ The very distinction between a historical approach and a more rhetorical reading geared towards the present might not have been as relevant to many humanists as it is to modern historians. Take for example Nicolas-Claude Fabri de Peiresc (1580-1637), an antiquarian and astronomer from the Provence.²⁰ As a humanist, he was not just interested in texts, but also in material artefacts, and he made astronomical observations. Peiresc, nowadays largely forgotten, was famous in his time, not in the least because he formed the centre of an extensive correspondence network and was therefore also a key figure in the Republic of Letters (see 1.3). The virtue of learned sociability, so important to eighteenth-century scientists, is already a core value for Peiresc and his circle.²¹ Furthermore, for Peiresc there was no obvious distinction between two cultures either: “Même l’étude des phénomènes physiques et astronomiques chez Peiresc est gouvernée par la discipline de l’*ars critica* appliquée au grand livre de la nature, et ils sont l’objet d’une recherché coopérative sur programme en équipe de philologues-savants.”²² The same method was applied to nature and to texts and no fundamental conceptual difference was made.

Apart from the lofty ideals of humanism as an intellectual belief, we can also take a more critical look at the humanities as a system of education, as Grafton and Jardine have done.²³ According to them, a humanist education became so popular because it suited the ruling elite of post-Reformation Europe and provided “a curriculum training a social élite to fulfil its predetermined social role.”²⁴ As an educational ideal for the elite, it would still be a powerful force within nineteenth-century Dutch society and resonate in the societies, as we will see. Less a professional training than a status symbol, a humanist education provided one with prestigious cultural knowledge.²⁵ The humanities, as an educational programme, came into existence during the first half of the sixteenth century, inspired by northern European humanists such as Agricola and Erasmus who saw humanism as “intrinsically morally regenerative and conducive to the formation of a true Christian spirit: a methodical programme for the moral regeneration of European civilisation and culture.”²⁶ The humanist education that was created, however, especially by Ramus, had not much to do with moral

¹⁹ Grafton, *Defenders of the Text*, 39, and *passim*.

²⁰ See Peter N. Miller, *Peiresc’s Europe: Learning and Virtue in the Seventeenth Century* (New Haven/London: Yale University Press, 2000) and Marc Fumaroli, *La République des Lettres* (Paris: Gallimard, 2015), 56ff.

²¹ Miller, *Peiresc’s Europe*, 50.

²² Fumaroli, *La République des Lettres*, 84.

²³ Anthony Grafton and Lisa Jardine, *From Humanism to the Humanities: Education and the Liberal Arts in Fifteenth- and Sixteenth-Century Europe* (Cambridge, MA: Harvard University Press, 1986).

²⁴ *Ibidem*, xvi.

²⁵ *Ibidem*, 57, 61.

²⁶ *Ibidem*, 125.

regeneration, but primarily with the conveyance of skills in grammar and math. An education in the classical humanities was the necessary training for a cultural and political elite and would remain so for a long time in the Dutch Republic, which partly explains the continuing role of humanist values and ideas in the Dutch societies in the nineteenth century.

Another humanistic sphere where education played a central role was that of the vernacular poets in the Netherlands, known as the Rhetoricians, although here the moral ideal of self-improvement *was* a key element. For many of these humanistic figures we can see that “in the last resort, the *bonae litterae* were as much an ethical as an aesthetic ideal.”²⁷ The basis of their programme was an attention to achieving command of pure and correct language, after which one could go on to the higher disciplines.²⁸ As Van Dixhoorn argues: “De zeven vrije kunsten werden ook in rederijkerskring beschouwd als propedeutische vakken die toegang gaven tot de kennis van de hogere wetenschappen.”²⁹ The Rhetoricians’ interest was very broad:

The intellectual careers of [...] (leading) rhetoricians illustrate that they were interested in the study of social, moral, political, and theological issues, as well as in several other arts and fields of learning in the vernacular, ranging from linguistics, mathematics, accountancy, arithmetic, architecture and painting, to astrology, astronomy, geography, history, and botany.³⁰

A good poet was supposed to be proficient in all the sciences and could, through his vernacular poetry, function as an intellectual leader and educator of the common people. In short: “The ideals of the improvement of speech, mind, and behaviour were crucial to rhetorician culture.”³¹ After gaining a sufficient level, they could then convey this knowledge to their local environment, often through theatrical performances, prize contests, and other popular events.³² We might be disinclined to see a connection between popular theatre and the world of Renaissance scholars, but “engagement in festive and burlesque culture did not necessarily mean disengagement from a devotion to serious knowledge and learning.”³³ In this way, the rhetoricians could act as intermediaries “between popular and learned culture”,

²⁷ Koen Goudriaan, “The Gouda Circle of Humanists”, in: Koen Goudriaan, Jaap van Moolenbroek and Ad Tervoort (eds.). *Education and learning in the Netherlands, 1400-1600. Essays in honour of Hilde de Ridder-Symoens* (Leiden: Brill, 2004), 177.

²⁸ Van Dixhoorn, *Lustige geesten*, 221.

²⁹ *Ibidem*, 225.

³⁰ Van Dixhoorn, “Chambers of Rhetoric: Performative Culture and Literary Sociability in the Early Modern Northern Netherlands”, in: Arjan Dixhoorn and Susie Speakman Sutch, *The Reach of the Republic of Letters. Literary and Learned Societies in Late Medieval and Early Modern Europe*. 2 vols. (Leiden/Boston: Brill, 2008), vol. 1, 153-4.

³¹ *Ibidem*, 133-4.

³² The chambers of Rhetoric often held refrain competitions, a foreshadowing of the prize contests in the scientific societies.

³³ Van Dixhoorn, “Epilogue”, in: Van Dixhoorn and Speakman Sutch, *The Reach of the Republic of Letters*, vol. 2, 422.

that is “between existing native – some would say medieval – ideas, values and practices, and their new, classically inspired counterparts which had penetrated the lives and thoughts of the educated middle and upper classes through the *studia humanitatis*.”³⁴ As the foremost institutions of the vernacular Republic of Letters, the Rhetoricians mediated between the international, classical Republic and their local, vernacular environment.³⁵ This role of educators of the vernacular public, and the desire to be useful to one’s local environment would also resonate in the Dutch societies in the strong presence of an utilitarian ideal of science, distinct from the more elitist Latinate humanist culture.

One key element of the early modern ideas about knowledge was the ideal of comprehensiveness, represented by the figure of the polymath or polyhistor, a figure that “wanted to cover every base on the intellectual field.”³⁶ In a book on the English virtuoso, Hanson has described their interests as ranging from “human anatomy, to ancient burial sites, to the technical aspects of glass production.”³⁷ These virtuosi were medical men who simultaneously and extensively explored art and antiquities.³⁸ As James Turner has argued, in his recent study of philology as an early modern discipline, under this umbrella scholars practised a wide range of what have now become different disciplines such as history, anthropology, sociology, folklore, religious studies, economics, geography, linguistics, etc.³⁹ A key assumption within this world was the idea that all knowledge formed a closed, finished corpus that could be learnt within the space of a single lifetime. In short, the universalistic aspect was important to many figures in the societies, which is why it merits a closer look.

1.2 Encyclopaedism

³⁴ Bart Ramakers, “Between Aea and Golgotha. The Education and Scholarship of Matthijs de Castelein (c. 1485-1550)”, in: Goudriaan, Van Moolenbroek and Tervoort (eds.), *Education and learning in the Netherlands*, 199.

³⁵ Van Dixhoorn, “Writing Poetry as Intellectual Training. Chambers of Rhetoric and the Development of Vernacular Intellectual Life in the Low Countries Between 1480 and 1600”, in: Goudriaan, Van Moolenbroek and Tervoort (eds.), *Education and learning in the Netherlands*, 222.

³⁶ Anthony Grafton, “The World of the Polyhistor: Humanism and Encyclopedism”, *Central European History* 18(1) (1985), 37.

³⁷ Craig Ashley Hanson, *The English Virtuoso: Art, Medicine, and Antiquarianism in the Age of Empiricism* (Chicago: University of Chicago Press, 2009), 3.

³⁸ On the many terms and types of intellectuals in early modern Europe, see Peter Burke, *A Social History of Knowledge. Vol. 1: From Gutenberg to Diderot. Based on the Series of Vonhoff Lectures Given at the University of Groningen (Netherlands)* (Cambridge: Polity Press, 2000), 18-31.

³⁹ Turner, *Philology*, 50ff.

In this section I will go into the assumptions about knowledge and science that we can find in the encyclopaedias that were written in the early modern period. With encyclopaedism, all I mean here is the (predominantly early modern) trend to write large works (whether called encyclopaedia or not) that collect a wide range of knowledge in a relatively limited number of volumes.⁴⁰ As Anthony Grafton has proposed, narrowly defined, encyclopaedism can be taken to mean “the specific effect to organize knowledge in systematic compendia”, whereas more broadly, it refers to “the more general intellectual aspirations of the polyhistor.”⁴¹ Without going into too much detail here, I will especially take a brief look at the diagrams and trees of knowledge that often prefaced those works.⁴²

Many historians have claimed that the term encyclopaedia is derived from the Greek words for circle (*kyklos*) and knowledge (*paideia*), leading to the phrase ‘circle of sciences’, which indicates the interconnected and unified nature of the sciences. However, this etymology might not be correct, as Ann Blair argues. According to her, ‘encyclopaedia’ is derived from the Greek *enkuklios paideia*, meaning roughly “common knowledge” or “general education”.⁴³ This points more to the function of the encyclopaedia as a useful way of collecting a diverse body of knowledge that has a pretension to be complete.

Reference books, dictionaries, and encyclopaedias of all kinds were produced in large numbers during the early modern period. The formation of disciplines and the modern university has often been seen as the outcome of a process of knowledge growth that made the ideal of the *homo universalis* unattainable. However, the overabundance of knowledge is more a change in degree than a change in kind, because complaints about the amount of books and knowledge were already quite commonplace in Antiquity. *Ars longa, vita brevis* was only

⁴⁰ William West, in a recent review article, has stated that: “Narrowly defined, *encyclopædism* is a particular manifestation of info-lust that emerged in the circles around Angelo Poliziano and other humanists in the late fifteenth century.” (William West, “Encircling Knowledge”, *Renaissance Quarterly* 68(4) (2015), 1332). Poststructuralists have criticized ‘encyclopædism’ for being a closed and totalizing format, incapable of reflecting change and diversity. This was not necessarily true of early modern encyclopaedias. Their format of serial publishing allowed for comments by the public which could be incorporated in later volumes.

⁴¹ Grafton, “The World of the Polyhistor”, 37.

⁴² For a general history of early encyclopaedism, see Jason König and Greg Woolf (eds.), *Encyclopaedism from Antiquity to the Renaissance* (Cambridge: Cambridge University Press, 2013). See also Andreas Kilcher, *mathesis und poiesis. Die Enzyklopädik der Literatur 1600 bis 2000* (Paderborn: Wilhelm Fink Verlag, 2003); Umberto Eco, “From the Tree to the Labyrinth”, in: *Ibid.*, *From the Tree to the Labyrinth: Historical Studies on the Sign and Interpretation*. Translated by Anthony Oldcorn (Cambridge, MA: Harvard University Press, 2014), 3-94; Anthony Grafton, “The World of the Polyhistor: Humanism and Encyclopædism”, *Central European History* 18(1) (1985), 31-47. For a recent review essay, see William West, “Encircling Knowledge”, *Renaissance Quarterly* 68(4) (2015), 1327-1340. Finally, see the collection of essays on encyclopaedias and dictionaries in *Dix-huitième siècle* 38 (2006).

⁴³ Ann Blair, *Too Much to Know: Managing Scholarly Information before the Modern Age* (New Haven: Yale University Press, 2010), 12.

the most famous adage expressing this sentiment, similar ones can be found in such diverse places as the biblical injunction that there is no end of making books (Eccl. 12:12) or in the phrase *mega biblion, mega kakon*, all the more striking for being supposedly uttered by the librarian of Alexandria's *Museon*, Callimachus.

However, it was during the early modern period that we can see a range of bibliographies and compilations of all kinds that reflect the desire for books which either collect all knowledge in one place, or at least give an overview of where all knowledge can be found. Ann Blair's *Too much to know* provides a fascinating account of this trend, and all the technical innovations and intricacies it involved, many of which, incidentally, were devised during the Middle Ages.⁴⁴ Here I am interested especially in the ideology behind those herculean efforts: what did the writers of those works hope to achieve with them?⁴⁵ And which ideas about the connections between disciplines can we find, e.g. in the trees and diagrams that visually represented those connections and were included in some of the most important encyclopaedias of the eighteenth century, such as Chambers' *Cyclopaedia* and the more famous French project it inspired?

The practice of compiling encyclopaedias (for writing one single-handedly had become virtually impossible in the eighteenth-century) took off during the eighteenth century. In an attempt to contain the growing body of knowledge, encyclopaedias could serve as memory aids, although they were not envisaged strictly as replacement memory.⁴⁶ They were inspired by the Renaissance practice of keeping commonplace books, described by Richard Yeo as "model for condensing knowledge, while also retaining a sense of intellectual order."⁴⁷ Some of the writers of encyclopaedias also believed that reading through the diverse collection of knowledge that was the encyclopaedia the reader might stumble upon unsuspected connections and relations.⁴⁸

The alphabetically arranged encyclopaedia had one problem though: alphabetical ordering is arbitrary and places concepts next to each other that might have no connection to

⁴⁴ One has to think here of practices that are now so common as to be completely unremarkable, such as alphabetically arranging topics and indices, tables of contents, concordances, differentiated page layouts (making it easier to distinguish citations, for example), and precise citation. See Blair, *Too much to know*, 33.

⁴⁵ The commercial motive is without doubt key, but some large, complex books were undertaken without a commission and their compilers, often steeped in humanism, must have had an intellectual motivation too. Theodor Zwinger's *Theatrum vitae humanae* (first edition 1565) is a case in point.

⁴⁶ Richard Yeo, *Encyclopaedic Visions: Scientific Dictionaries and Enlightenment Culture* (Cambridge: Cambridge University Press, 2001), 59-98.

⁴⁷ *Ibidem*, 98.

⁴⁸ *Ibidem*, 141.

each other at all.⁴⁹ This problem could be addressed to some extent by using cross referencing, a device used by both Chambers and the French Encyclopaedists. In addition to that, the branching diagram was a popular way of visually representing the contents of a book: it usually proceeded by binary divisions, ending in the different chapter headings. This device was made popular by Petrus Ramus (1515-72) who made it the cornerstone of an entire logical system.⁵⁰ To be sure, part of the goal of utilizing such a device was the simple need to organize the massive tomes in which they figured. But the branching diagram is also a device that we can connect to the complex of ideas discussed in the previous paragraph. A philosophical quest for the essential and eternal order of things, possibly Neoplatonic in inspiration, can also be discerned.⁵¹ We should be careful not to read too much into this, but it is clear that, in any case, those diagrams visualized the connections between all the parts of a given topic, or even between all the aspects of human knowledge, in the case of the diagrams in encyclopaedias. They are therefore part of a world that emphasizes the unity of knowledge and science, which takes special care to convey to the reader how every aspect of knowledge relates to the larger corpus.

Encyclopaedias could use similar devices to organize and unify knowledge, such as the tree of knowledge (*arbor sapientiae*) or the intellectual globe devised by Bacon, which divided the world of human learning into the circles of memory (related to the discipline of history), imagination (poetry), and reason (philosophy).⁵² The word dividing might not be entirely apt here, for the goal for Bacon and others was not to erect disciplinary boundaries, but to show how all learning was connected and contributed equally to the goal of ethical self-knowledge. The *arbor scientiarum*, as it was also known, can already be found in the Middle Ages in the work of the logician Ramón Lull. His goal was a search for “einer Logik, die die Wissenschaften vereinst, d.h. nach einer universalen Methodologie der Wissenschaft, und

⁴⁹ Jeff Loveland, “Unifying Knowledge and Dividing Disciplines: The Development of Treatises in the *Encyclopaedia Britannica*”, *Book History* 9 (2006), 58. Even more basic, the very act of describing a given topic at length runs the risk of becoming incoherent and shapeless, rather than conveying a unified picture of the subject. See Joanna Stalnaker, *The Unfinished Enlightenment: Description in the Age of the Encyclopaedia* (Ithaca: Cornell University Press, 2010), 38-39.

⁵⁰ Blair, *Too much to know*, 144ff. An example of such a diagram can be found in Robert Burton’s sprawling work *The Anatomy of Melancholy*.

⁵¹ Blair, *Too much to know*, 149.

⁵² Yeo, *Encyclopaedic Visions*, 22-23. See for Bacon’s views on knowledge: Sachiko Kusukawa, “Bacon’s Classification of Knowledge”, in: Markku Peltonen (ed.), *The Cambridge Companion to Bacon* (New York: Cambridge University Press, 1996), 47-74. The diagram of knowledge, as presented by Bacon in his *De augmentis scientiarum* is reproduced on page 69.

nach einer Enzyklopädie, die die Einheit der diversen Wissenszweige demonstriert.”⁵³ In this way, the tree of knowledge was also used in many early modern compilations.

The tree of knowledge as a preface to the encyclopaedia was used, for example, by Ephraim Chambers in his *Cyclopaedia* (see Figure 1), the inspiration for the more famous French *Encyclopédie*. Chambers’ tree was inspired by Ramus’ use of increasingly specific dichotomies. Starting with a division between natural-scientific and artificial-technical knowledge, Chambers went on to divide natural-scientific knowledge into ‘sensible’ (e.g. meteorology) and ‘rational’ knowledge, placing theology and ethics under the latter. Artificial-technical knowledge was dichotomized into ‘internal’ (logic) and ‘external’ (the fine and applied arts and crafts, as well as the more practical sciences such as chemistry). This is one of the noticeable features of knowledge and science in this period, which we will also encounter in our Dutch societies: the arts (whether in their modern meaning as fine arts or as mechanical arts) have a firm place among the sciences, and are not disdained as practical skills on a lower level than the theoretical disciplines. Through this scheme, the reader could easily orient himself in the world of learning: the diagram provided a map of sorts which would guide the reader through the wilderness of the world of learning.⁵⁴ The tree of knowledge introduced by d’Alembert in the ‘Discourse préliminaire’ to the *Encyclopédie* (Figure 2) was inspired by the Baconian division of the sciences according to the faculties of memory, imagination, and reason. Here we also encounter the interest in mechanical arts. As is well known, the *Encyclopédie* is full of lavish illustrations of, and instructions on, technical procedures such as glass-making.

Bacon’s ideas about science were very important for the emergence of scientific societies.⁵⁵ In the House of Solomon from *New Atlantis*, there are many humble gatherers of knowledge, but there are also Interpreters of Nature who tie everything back together into more general conclusions: in this vision as well, knowledge is, quite literally, a building. As one of the pioneers of the study of scientific societies has put it: “[Bacon] is the veritable apostle of learned societies.”⁵⁶ In Bacon, and encyclopaedism in general, there is a tension, however, between the ideal of containing all knowledge and experimenting upon nature: “die Idee der Endlichkeit des Wissens, das als Pansophie in einer abgeschlossenen Enzyklopädie dargestellt werden kann, doch in den geschilderten Laboratorien aller Art werden ausgehend

⁵³ Kanthak, *Der Akademiegedanke*, 100.

⁵⁴ Yeo, *Encyclopaedic Visions*, 139.

⁵⁵ Richard McClellan, *Science Reorganized: Scientific Societies in the Eighteenth Century* (New York: Columbia University Press, 1981), 48.

⁵⁶ Martha Ornstein, *The Role of Scientific Societies in the Seventeenth Century* (New York: Arno Press, 1975 [1928]), 43-44.

von dem Wissenschaftsoptimismus, alles sei erkennbar, neue experimentelle Verfahren der naturwissenschaftlichen Forschung praktiziert.”⁵⁷ A lot of the early modern thinking about science bears this tension between universality and closed-ness on the one hand, and the open-handed character of empirical study on the other hand. As we will see in chapters three and four, the ever increasing amount of knowledge made it harder and harder for the societies to stick to an encyclopaedic ideal.

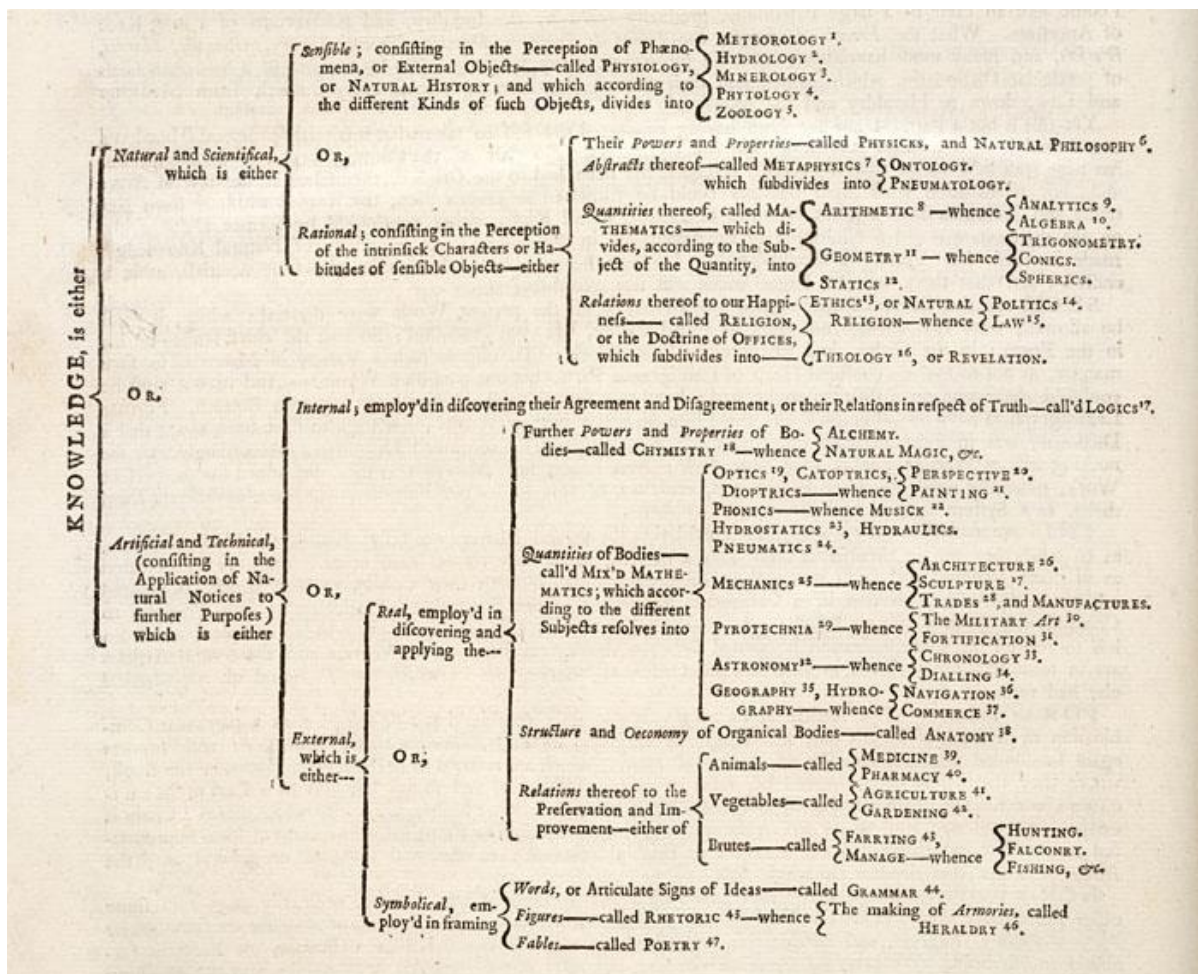


Figure 1. Chambers' 'View of Knowledge' as it appeared in Volume I, p. ii of his *Cyclopaedia*, as well as in all subsequent volumes.

⁵⁷ Kanthak, *Der Akademiegedanke*, 17.

1.3 Communicating knowledge: the Republic of Letters

The Republic of Letters was the informal network of scholars that was at its height between 1550 and 1750.⁵⁸ Like the societies emerging in the same period (see the next chapter) it was partly motivated by the desire to create a sphere of peaceful learning that was detached from the wars and religious conflicts of early modern Europe.⁵⁹ Building on the model of the *Respublica christiana*, led by the Pope, humanists envisioned a *Respublica litteraria*.⁶⁰ Through correspondence networks ranging all over Europe, scholars worked together on the progress of science. However, the ideal of the *homo universalis* was receding on the horizon because of the exponential growth in knowledge:

Dès le XVII^e siècle, les progrès du savoir et une production imprimée chaque jour plus abondante ne permirent plus même aux grands héritiers de l'humanisme érasmien, tels Hugo Grotius, G.J. Vossius ou C. Saumaise, d'opérer la synthèse des connaissances. Le savoir devint un ensemble aux contours indéfinis et mouvants, impossible à embrasser dans sa totalité; il fallait désormais faire des choix; le polyhistor ne pouvait alors que survivre à ses anciennes ambitions.⁶¹

During the eighteenth century, Bots and Waquet argue, cracks appear in the building of the Republic: knowledge becomes subject to a process of enclosure, disciplines set themselves apart from each other and this inevitably harms the idea that the sciences form a unity. One of the fathers of modern science, Descartes, thought the structure of the Republic of Letters impeded scientific progress: he was in favour of more isolated scientists working on original research, rather than building on the work of others: “l'idée s'imposa qu'il importait désormais d'être 'moins savant' et 'plus raisonnable’”.⁶² This was all part of the rhetorical strategy employed by the new science: Descartes and others could lend more authority to their own work by degrading what came before. In the process they created an influential narrative in which the literary culture of humanism is supposedly superseded by the natural sciences between Galilei and Newton.⁶³ Apart from the fact that this narrative misrepresents the character of humanist science as exclusively literary and contains a questionable value judgment about the humanities, it also amounts to a linear account that is historically inaccurate. The humanist education and culture was highly appealing to many and kept living on through the humanistic heritage that was still taught to generations. As we will see later,

⁵⁸ Recently, historians have also started using the term Republic of Science. See the special issue *Dix-huitième siècle* dedicated to this subject: *Dix-huitième siècle* 40 (2008).

⁵⁹ Bots and Waquet, *La République des Lettres*, 29.

⁶⁰ Fumaroli, *La République des Lettres*, 33-35.

⁶¹ Bots and Waquet, *La République des Lettres*, 48.

⁶² *Ibidem*, 49.

⁶³ Grafton, *Defenders of the Text*, 1-5.

the ideal of the unity of knowledge lived on within the nineteenth century Dutch societies. In those societies, the emphasis (at least in the earlier period of their existence) would be on service to the home country. Members of the Republic of Letters could have an attachment to their local environment as well, but they often emphasized the ease with which knowledge negotiated borders, especially those of nationality and religion.⁶⁴ In its later phase, humanism also had much less of a public presence than it had earlier and the Republic of Letters became a more self-contained group.⁶⁵

Acquiring information and knowledge on a wide range of topics through the exchange of letters between scholars spread all over Europe - sometimes in splendid isolation - was therefore one way of becoming a member of a knowledge network. The other major avenue for connecting with other researchers was the learned society. In order to provide more background to the societies I will discuss here, and allow for some comparisons with the larger European context, the next chapter will sketch the development and character of those learned societies.

⁶⁴ Bots and Waquet, *La République des Lettres*, 63-70.

⁶⁵ Turner, *Philology*, 48-9.

Chapter Two - Academies and societies in Europe and the Dutch Republic

2.1 The Wars of Religion and the desire for harmony

In the previous chapter, it has become clear how important the ideals of unity and harmony were for many scholars. This is reflected in the history of the academy as a place where harmony reigns. Originally referring just to a (countryside) house where friends met for informal learned conversation, the concept developed into a large number of more formalized institutions: the academy as we have come to understand the word.⁶⁶ The Italian Renaissance academies could have a rather mystical orientation (see the next section), but as Gerhard Kanthak has argued, the Reformation gave the academic movement a more “diesseitigen Orientierung.”⁶⁷ Coupled with the emergence of the new science, the “barocke Projektmacherei” of absolute monarchs such as those of Prussia and France, and the desire for peace and harmony as an answer to the religious wars of the sixteenth and seventeenth centuries, this gave a new impetus to the growth of societies as places of learning and unity.⁶⁸ The academicians “versuchen aus der Zerrissenheit der Welt [...] zu einer geistig-religiösen Erneuerung, zu einer neuen Einheit zu gelangen.”⁶⁹ For example, a German society like the *Fruchtbringende Gesellschaft*, a literary society founded in 1617, aimed at unity in war-torn Germany.⁷⁰ One member of this society was Johann Valentin Andreae, who wrote the utopian *Christianopolis* (1619) and was the forerunner of the similarly utopian longings for peace of Johann Amos Comenius.⁷¹ As Marc Fumaroli summarizes: “L’ethos harmonique des académies répare cette scission, et elle ira bien au-delà de son modèle antique, agrégeant à la dignité du savoir les arts ‘mécaniques’”.⁷² Promotion of science (including technical procedures and applications!) was therefore a key element of their visions, which also contained the same mystical elements we find in the Italian and French Renaissance societies,

⁶⁶ On the conceptual history of the concept of ‘academy’, see J. Hankins, “The Myth of the Platonic Academy of Florence”, *Renaissance Quarterly* 44(3) (1991), 429-475 and D.S. Chambers, “The Earlier ‘Academies’ in Italy”, in: D.S. Chambers and F. Quiviger (eds.), *Italian Academies of the Sixteenth Century* (London: The Warburg Institute, 1995), 1-14. For a detailed analysis of the semantics and conceptual connotations of ‘academy’, see Fumaroli, *La République des Lettres*, 139-167 and 269-303.

⁶⁷ Kanthak, *Die Akademiegedanke*, 12.

⁶⁸ Ibidem, 9-10.

⁶⁹ Ibidem, 15.

⁷⁰ R.J.W. Evans, “Learned Societies in Germany in the Seventeenth Century”. *European Studies Review* 7 (1977), 131, 146.

⁷¹ Comenius in his turn influenced the English polymaths John Dury and Samuel Hartlib, who had similar grand visions of universal knowledge and peace. Leibniz’ designs for an academy also took their cue from Comenius to some extent. See Kanthak, *Die Akademiegedanke*, 33-63 and 72-81, respectively.

⁷² Fumaroli, *La République des Lettres*, 158.

combining humanism with Hermeticism and Neoplatonism. By the time the scientific societies started to become encapsulated by the state, however, that religious dimension largely disappeared, though, as we will see, a moral connotation to science was important to Dutch society members.

2.2 Learned and literary societies in early modern Italy and France

In the previous sections I have attempted to show that the humanist culture of the late Middle Ages and early modern period was a culture where the pursuit of knowledge, art, and the morally good life were regarded as inextricably linked strands of the same project. It will come as no surprise, then, that the first learned societies that arose in this culture were of a very broad outlook, combining a pursuit of the arts with the pursuit of knowledge.⁷³ This first wave of organised sociability started roughly around 1450: growing humanist networks, combined with the growth of a performative literary culture and the innovation of the printing press, led to the founding of many, usually rather informal, societies.⁷⁴ The origins of this movement have often been located in Renaissance Italy, but we can trace similar developments to medieval Germany and France, as Van Dixhoorn and Speakman Sutch have shown, arguing for a polygenetic rather than a monogenetic account of the origins of literary and learned sociability.⁷⁵

The goal of the members of these societies was to become proficient in all fields of learning, not just the in poetry and literature. They often presented themselves to the outside worlds as places where poetry and music were performed, and the modern disciplinary boundaries between fields such as literary history and the history of science might lead modern historians to stress one aspect of these societies. But the danger of such an anachronistic approach is that it obscures the fact that for many members of these societies the very distinction between art and learning would not have resonated at all. One example of such an Italian Renaissance society is the *Accademia degli Alterati*, founded in 1569 in Florence. The concept of *alterazione* in their title is Aristotelian in inspiration, referring to the

⁷³ For a (geographically) diverse panorama of early modern societies, see Klaus Garber and Heinz Wisman (eds.), in collab. with Winfried Siebers, *Europäische Sozietätsbewegung und demokratische Tradition: die europäischen Akademien der Frühen Neuzeit zwischen Frührenaissance und Spätaufklärung*. 2 vols. (Tübingen: Niemeyer, 1996). See also Arjan van Dixhoorn and Susie Speakman Sutch, *The Reach of the Republic of Letters. Literary and Learned Societies in Late Medieval and Early Modern Europe*. 2 vols. (Leiden/Boston: Brill, 2008).

⁷⁴ Arjan van Dixhoorn and Susie Speakman Sutch, "Introduction", in: Van Dixhoorn and Speakman Sutch, *The Reach of the Republic of Letters*, vol. 1, 3.

⁷⁵ *Ibidem*, 6-9. This section will focus on Italian and French academies. For more on the early history of British societies, see Peter Clark, *British Clubs and Societies, 1580-1800: The Origins of an Associational World* (Oxford: Oxford University Press, 2000).

actualization of potential qualities. As Henk van Veen puts it: “In practice, it amounted to an active process of spiritual and moral self-improvement, which aimed at expelling ignorance.”⁷⁶ Knowledge first and foremost served a moral goal, and to pursue just one discipline was of limited value to building a well-rounded character. In short, in the early Italian academies, harmony and encyclopaedism were key pursuits.⁷⁷

Similar ideas can be found in sixteenth-century French societies, as Frances Yates argued in an influential book: “the range of interests is encyclopaedic yet unified.”⁷⁸ Yates emphasizes that the sixteenth-century French academicians wanted to counteract the divisiveness of the Reformation with a Renaissance universalism that was steeped in Neoplatonism. According to her, this influence originates in the syncretistic circles in Italy around Pico della Mirandola and Ficino. A direct link can even be traced between the Florentine Medici’s, who encouraged these figures, to the French Valois kings who were descended from the Medici’s, and supported and visited the gatherings of the major French academicians of the *Pléiade*, led by Pierre de Ronsard, and Baïf’s *Académie de Poésie et de Musique*, founded in 1570. With a name like that, one might expect a purely artistic society, but this academy was not purely literary by any stretch of the imagination: it is even reported of Ronsard and Baïf that they discussed Copernicus.⁷⁹ The ideology behind these French academies was explicated by Marin Mersenne, who argued that academies aimed at perfecting man, both in mind and in body. Knowledge was a means to the end of individual improvement.

The most explicit discussion of the relationship of music to the encyclopaedia was given by one of the co-founders of the *Pléiade*, Pontus de Tyard, in his *Discours philosophiques* (1587). According to him, the union of poetry and music can be understood in

⁷⁶ Henk Th. van Veen, “The Accademia degli Alterati and Civic Virtue”, in: Van Dixhoorn and Speakman Sutch, *The Reach of the Republic of Letters*, vol. 2, 287. Another example of such a society is the ‘Consistori del gay saber’ that was active in Toulouse between 1323 and ca. 1484. This group can be classified as a poetry society, but learning was an integral part of their activities, as reflected in their belief that “joy is the legitimate offspring of Learning”. They believed in a kind of moral intellectualism in which knowledge and learning enable one to do good deeds and create quality art, which leads to praise and honor and consequently joy. See Laura Kendrick, “The Consistori del Gay Saber of Toulouse”, in: Van Dixhoorn and Speakman Sutch, *The Reach of the Republic of Letters*, vol. 1, 17-32, citation on 25.

⁷⁷ See especially Lina Bolzoni, “‘Rendere visibile il sapere’: L’Accademia Veneziana fra modernità e utopia”, in: Chambers and Quiviger (eds.), *Italian Academies of the Sixteenth Century*, 61-77, as well as the other articles in this edited volume.

⁷⁸ Frances Yates, *The French Academies of the Sixteenth Century* (London/New York: Routledge, 1988 [1947]), 1. For a more recent article commenting on this book and period, see Klaus Ley, “Von der ‘Brigade’ zur ‘Académie du Palais’. Zur Institutionalisierung humanistischer Bildungsideale in Frankreich unter den letzten Valois”, in: Garber, and Wismann (eds.), *Europäische Sozietätsbewegung und demokratische Tradition*, vol. 1, 287-327.

⁷⁹ Yates, *The French Academies*, 15, and 95-104.

a literal sense as an artistic activity, but also in a more symbolical sense as “a stage in a graded hierarchy of knowledge.”⁸⁰ The greater vision of Pontus de Tyard closely resembles a (mystic) Neoplatonic ascent: starting with the individual disciplines, one then goes on “to perceive a kind of coherence and unity in the whole encyclopaedia of the separate arts and sciences.”⁸¹ If one reached the end of this journey, the academician could produce ‘divine poetry’: without knowing exactly how, in a divine rapture of sorts, he grasped the entire encyclopaedia intuitively and could sing about it in ‘hidden’ images. The finer details of this ultimate state of knowledge and art need not concern us here, but what is clear is that the coherence and unity of knowledge were a core belief of these French academicians of the sixteenth century.

The societies discussed here had the full support of the French kings. Around 1700 it became harder for these Renaissance societies, focussed as they were on contemplation, to gain such support. Early in the seventeenth century Florence Rivault devised a plan for an all-encompassing academy, but in presenting it, he made sure to show the practical benefits the country could expect from such an academy. As Yates argues: “He evidently thinks that he will only gain support for the encouragement of a contemplative enterprise by emphasising its practical bearings on the active life.”⁸² In the end, the eventual *Académie Française* would limit itself to grammar and rhetoric. Although the ideal of the broadly interested scholar lived on, institutionally, the time of the broad French Renaissance Academies was definitively over.

⁸⁰ Yates, *The French Academies*, 77.

⁸¹ *Ibidem*, 79. Tyard had read Plato’s *Phaedrus* with Ficino’s commentary, so the Neoplatonic influence is clearly present. Aristotle was not absent however: debates on the moral and intellectual virtues were conducted along the lines of the *Nicomachean Ethics*, possibly mediated through Thomas Aquinas. Aristotelian ethics led to rational discipline and moral control of the passions, but was seen as unable to guide one to the higher mysteries, which is where Neoplatonism comes in. Bartolommeo Delbene’s *Civitas veri sive morum* (1609) provides an important account of this fusion of two very different philosophies, which could even be made to fit with Christianity. See Yates, *The French Academies*, 108-118.

⁸² Yates, *The French Academies*, 277.

2.3 The rise of the (scientific) society in the seventeenth and eighteenth century

During the seventeenth century the first examples of a new type of learned society emerge. Ferdinand van Ingen has summarized the character of these new seventeenth century academies by saying “daß sie sich als Gemeinschaften von gelehrten Männern verstehen, die sich gegenseitig über allgemein interessierende Fachprobleme informieren, ausschließlich zum Zwecke der Erweiterung ihres Kenntnis- und Erkenntnisstandes und unabhängig vom universitären Lehrbetrieb.”⁸³ Growing out of the earlier, more literary societies such as the *Accademia della Crusca*, 1583 or the *Fruchtbringende Gesellschaft*,⁸⁴ some groups turned also to the natural science. Early examples of such societies are the *Accademia dei Lincei* (Rome, 1603-1630) and the *Accademia del Cimento* (Florence, 1657-1667). It was no longer possible – if it ever had been – for one man to practice all the sciences, but a body of men could still strive for a comprehensive approach and practice a wide range of disciplines.⁸⁵ This conviction led to the founding of a number of the most prestigious and famous societies during the seventeenth century. The Royal Society in London was founded in 1660 and received a royal charter in 1662. In France, the *Académie des Sciences* was just one of a number of state institutions founded around the middle of the seventeenth century:

- Académie Française	1635
- Académie Royale de Peinture et Sculpture	1648
- Académie de Danse	1661
- Académie des Inscriptions et Belles-Lettre	1663
- Académie des Sciences	1666
- Académie Royale de Musique	1669

In contrast with the Dutch societies, the *Académie des Sciences* did not include *érudits* and amateurs, but had a much more limited membership of professional scholars and scientists.⁸⁶ From 1720 onwards, it would also start prize contests, which would become the key activity for many Dutch societies. The development in Germany followed somewhat later, when Leibniz' incessant lobbying led to the founding of the Prussian *Societas Scientiarum* in

⁸³ Ferdinand van Ingen, “Der Akademiengedanke in der niederländischen Republik bis zum Ausgang des 17. Jahrhunderts”, in: Garber and Wismann (eds.), *Europäische Sozietätsbewegung und demokratische Tradition*, vol. 1, 837.

⁸⁴ See for German societies in the seventeenth century Evans, “Learned Societies in Germany in the Seventeenth Century”. For the *Fruchtbringende Gesellschaft*, see Gabriele Ball, “*Alles zu Nutzen* - The Fruchtbringende Gesellschaft (1617-1680) as a German Renaissance Academy”, in: Van Dixhoorn and Speakman Sutch. *The Reach of the Republic of Letters*, vol. 2, 389-422.

⁸⁵ Irene Baldriga, “Reading the Universal Book of Nature: The Accademia dei Lincei in Rome (1603-1630)”, in: Van Dixhoorn and Speakman Sutch, *The Reach of the Republic of Letters*, vol. 2, 365-6.

⁸⁶ W.W. Mijhardt, “Het Nederlandse genootschap in de achttiende en vroege negentiende eeuw”, *De negentiende eeuw* 7 (1983), 78.

1700.⁸⁷ Despite the ideal of harmony, this society had three sections, for *Res physico-mathematicae*, *res literaria*, and *lingua germanica*.⁸⁸ This official state society had been preceded by some earlier specimens, such as the short-lived *Societas Ereunetica* in the 1620s and the more important *Academia Naturae Curiosorum*, founded in 1652 and officially recognized later as the *Academia Caesaro-Leopoldina*.

The heyday of the scientific society, however, was the eighteenth century: from less than ten official societies in 1690, their number increased to more than sixty a century later.⁸⁹ James McClellan has argued, in his overview of scientific societies in the eighteenth century, that “the scientific societies predominated over other institutions and modes of organization for science in the eighteenth century. [...] They provided the primary institutional affiliation for the leading members of the scientific community of the time.”⁹⁰ Part of the reason for the flourishing of scientific societies in the eighteenth century was the government support they received: “European governments increasingly supported and structured novel social and institutional forms for eighteenth-century science. Governments moved to support science for the perceived usefulness of expert knowledge of nature.”⁹¹ McClellan sees this organizational form as a typical *Ancien Régime*-approach, where governments take the initiative and try to control science, until the nineteenth century, when a new and more independent institutional organization would emerge, characterized by specialized societies, journals and an increasingly prominent role for the university.⁹² However, this account is an abstraction of the most common development in Europe, which cannot be applied directly to the Netherlands. As we will see later, the government had a less active approach in stimulating science in the

⁸⁷ On the Académie des Sciences, the classic work is by Roger Hahn, *The Anatomy of a Scientific Institution: The Paris Academy of Sciences, 1666-1803* (Berkeley: University of California Press, 1971). A lot of literature that deals largely but not exclusively with the German background can be found in some of the bulky edited volumes published by German historians on the topic. See especially Klaus Garber and Heinz Wismann (eds.), in collab. with Winfried Siebers, *Europäische Sozietätsbewegung und demokratische Tradition: die europäischen Akademien der Frühen Neuzeit zwischen Frührenaissance und Spätaufklärung*. 2 vols. (Tübingen: Niemeyer, 1996); Ulrich Johannes Schneider (ed.), *Kultur der Kommunikation: die europäische Gelehrtenrepublik im Zeitalter von Leibniz und Lessing* (Wiesbaden: Harrassowitz, 2005); Ulrich Johannes Schneider (ed.), *Kulturen des Wissens im 18. Jahrhundert* (Berlin/New York: De Gruyter, 2008); André Holenstein, Hubert Steinke and Martin Stuber (eds.), in collab. with Philippe Rogger, *Scholars in Action: The Practice of Knowledge and the Figure of the Savant in the 18th Century*. 2 vols. (Leiden: Brill, 2013).

⁸⁸ Ornstein, *The role of scientific societies*, 191-192.

⁸⁹ McClellan, *Science Reorganized*, 67.

⁹⁰ *Ibidem*, xx-xxi.

⁹¹ Richard McClellan, “Scientific Institutions and the Organization of Science”, in: Roy Porter, (ed.), *The Cambridge History of Science, Vol. 4: Eighteenth-Century Science* (Cambridge: Cambridge University Press, 2003), 87.

⁹² *Ibidem*. The university had lost its central role in the seventeenth century, when scientists increasingly left the university and started working under the patronage of Renaissance princes.

Dutch Republic, and while specialization and the rebirth of the university took place there as well, this did not necessarily mean that older ideas about science disappeared completely.

As historians have noted before, the Dutch societies, operating in a relatively small area, are more accurately compared to the many provincial institutions that sprang up in France during the eighteenth century.⁹³ The emergence of numerous official and unofficial organizations points to a conviction shared all over Europe, i.e. that a contemporary city simply could not do without a scientific organization. As McClellan puts it: “Among at least a certain class of urban dwellers, the formation of learned societies represented an expression of contemporary sociability, and, complementing the elite organizations, dozens of unofficial organizations augmented the set of formally chartered institutions.”⁹⁴ At some point, so many countries and cities had a scientific institution that it became a “self-generating, self-justifying, and self-fulfilling phenomenon.”⁹⁵ It became something everyone had, so that it was almost self-evident that you could not do without one. Many of those organizations received official recognition and financial support in exchange for functioning from time to time as an advisory board for the government and providing technical solutions for local problems. This is often presented as a business deal: the government needed the expertise while the societies needed the money and sought the prestige of official recognition. Yet I would argue that there is also a more ideological element here: many of the members of the academies were also influenced by the spirit of the Enlightenment. A truly modern citizen was aware of the latest scientific and scholarly developments, and applied himself to making new discoveries useful for the nation. This was certainly the case in the Netherlands, where government subsidies were less common and the initiative to find a society was often taken from a concern with the perceived moral and economic decay of the Republic. Of course, especially in a smaller state such as the Netherlands, government officials were often members of the societies. In general, according to McClellan, the French Revolution symbolizes the end of the importance of scientific societies. The period 1789-1815 is something of a hiatus, after which societies became fossilized institutions, to which one was appointed for reasons of prestige. Serious scientific work was not done in those societies anymore.⁹⁶ Again, this might be valid for Europe as a whole, but it seems less accurate for the Dutch societies, as we will see in the next two chapters.

⁹³ See Daniel Roche, *Le siècle des lumières en province: académies et académiciens provinciaux, 1680-1789*, 2 vols. (Paris: École des Hautes Études en Sciences Sociales, 1987).

⁹⁴ McClellan, “Scientific Institutions”, 91.

⁹⁵ McClellan, *Science Reorganized*, 112.

⁹⁶ *Ibidem*, 253.

2.4 The Dutch context

The late medieval and early modern culture in which learning and art were part of one and the same pursuit also had its adherents in the Netherlands. The aforementioned chambers of Rhetoricians (*rederijkers*) are the prime example in the Dutch context. Dutch societies and academies developed relatively late. Prior to the eighteenth century there is not much beyond the Rhetoricians that we can point to. A major reason for this is the relatively advanced state of Dutch universities, especially Leiden, around 1600. Firmly rooted in the humanist culture we have sketched above, Leiden could boast of a significant numbers of the most renowned humanists and philologists of early modern Europe. Institutionally, the academies that were founded in Italy, France, and elsewhere in Europe during the fifteenth and sixteenth centuries (or even earlier) were usually of a local or national character. The famous Dutch universities were part of a different institutional circle, that of the international Republic of Letters. After all, many of the professors teaching at the Leiden University were not even Dutch to begin with. One of the few attempts to create something of a Dutch academy along the lines of European examples, and inspired by the local Rhetorician culture, was the short-lived *Nederduytsche Academie*, founded in 1617 (and lasting until 1622) by Samuel Coster (1579-1665).⁹⁷ Characterized by Van Ingen as a vernacular reaction against the Latinate universities, Coster wanted the government to curb ecclesiastical powers so as to carve out a sphere of influence for independent academies and societies.⁹⁸ The project was a failure to the extent that in 1632 a new school was founded, the Atheneum Illustre, where Latin was once again the official language. As a young state, the Dutch Republic needed such universities and schools for their traditional role of training officials, lawyers, doctors, and ministers.

In Coster's academy, the traditional focus of the Rhetoricians on both the trivium and the quadrivium (as illustrated above through the work of Van Dixhoorn) was maintained: besides the literary disciplines of the trivium, there was also plenty of attention for history and moral philosophy: once again we see the close link between knowledge and the good life.⁹⁹ Interestingly, Samuel Coster had a background in the theatre world, which he shared with the founders of the most well-known seventeenth-century Dutch academy, the theatre group *Nil volentibus arduum*, founded in 1669, which also had a very broad set of interests. Neither society therefore was purely learned, but combined the arts with learning. In general, literary

⁹⁷ See Mieke B. Smits-Veldt, "The First Dutch Academy of Dr. Samuel Coster. Humanist Ideals in Dutch Attire (1617-1622)", in: Garber and Wismann (eds.), *Europäische Sozietätsbewegung und demokratische Tradition*, vol. 1, 853-878; Van Ingen, "Der Akademiegedanke in der niederländischen Republik bis zum Ausgang des 17. Jahrhunderts", 840-843.

⁹⁸ Van Ingen, "Der Akademiegedanke", 842.

⁹⁹ Smits-Veldt, "The First Dutch Academy", 861, 864.

societies emerged somewhat earlier in the Dutch Republic, and they were quite numerous.¹⁰⁰

The emergence of a Dutch world of societies took place in the second half of the eighteenth century. After the founding of the HMW in 1752, a number of other national societies as well as a whole host of smaller societies came into existence. When the HMW was founded, one of its first members, the Leiden professor Lulofs had predicted that it would be unlikely many would follow, for a small country like the Dutch Republic could not support a whole host of scientific societies in the way France did.¹⁰¹ He was proven wrong in the following decades. The HMW was followed by the *Zeeuwsche Genootschap van Wetenschappen* in 1765,¹⁰² the *Bataafsche Genootschap der Proefondervindelijke Wijsbegeerte* in 1769,¹⁰³ the *Bataviaasche Genootschap van Kunsten en Wetenschappen* (operating from colonial Batavia) in 1778,¹⁰⁴ and *Teylers Genootschap*, also in 1778.¹⁰⁵ In addition to these societies with a national recruiting policy, there were many more locally oriented societies, which often connected the middle class citizens – doctors, lawyers, etc. – with an interest in science of provincial towns.¹⁰⁶ This was the case in Groningen, where societies focussing on

¹⁰⁰ C.B.F. Singeling, *Gezellige schrijvers: aspecten van letterkundige genootschappelijkheid in Nederland, 1750-1800* (Amsterdam: Rodopi, 1991); W. van den Berg, "Literary Sociability in the Netherlands, 1750-1840", in: M.C. Jacob and Wijnand Mijnhardt. *The Dutch Republic in the Eighteenth Century: Decline, Enlightenment, and Revolution* (Ithaca: Cornell University Press, 1992), pp. 253-269; Inger Leemans and Gert-Jan Johannes. *Worm en donder: geschiedenis van de Nederlandse literatuur 1700-1800: De Republiek* (Amsterdam: Uitgeverij Bert Bakker, 2013), esp. pp. 216-248. For an inventory of eighteenth-century literary societies, cf. J.J. Kloek et al., "Literaire genootschappen, 1748-1800", *Documentatieblad Werkgroep Achttiende Eeuw* 15 (1983), pp. 21-89 as well as C.B.F. Singeling, "Literaire genootschappen, 1748-1800: Aanvullingen en correcties", *Documentatieblad Werkgroep Achttiende Eeuw* 18 (1986), pp. 65-74. Reading societies are part of literary sociability as well: see e.g. Frans Wilhelm, "The English reading society, 1792-1817: een oud Engels leesgezelschap in Nederland", *De negentiende eeuw* 23(3) (1999), pp. 129-142 and Boudien de Vries, "Leerzaam vermaak? Enkele geleerde en verstrooiende genootschapsbibliotheken in de negentiende en twintigste eeuw", *De negentiende eeuw* 24(3-4) (2000), pp. 247-261.

¹⁰¹ Bierens de Haan, *De Hollandsche Maatschappij*, 23.

¹⁰² W.W. Mijnhardt, *Tot heil van 't menschdom: culturele genootschappen in Nederland, 1750-1815* (Amsterdam: Rodopi, 1987), 124-223

¹⁰³ Operating under the motto *Certos feret experientia fructus*, this society expressly forbade any involvement with any non-experimental aspect of science. See: Anonymous, *Twee honderd jaar Bevordering van de Proefondervindelijke Wetenschappen 1769-1969* (S.l.: Bataafsche Genootschap der Proefondervindelijke Wijsbegeerte, 1969); M.J. van Lieburg, *Het Bataafsche Genootschap der Proefondervindelijke Wijsbegeerte te Rotterdam. 1769-1984. Een bibliografisch en documenterend overzicht* (Amsterdam: Rodopi, 1985); M.J. van Lieburg and H.A.M. Snelders. 'De bevordering en volmaking der proefondervindelijke wijsbegeerte'. *De rol van het Bataafsche Genootschap te Rotterdam in de geschiedenis van de natuurwetenschappen, geneeskunde en techniek (1769-1988)* (Amsterdam: Rodopi, 1989).

¹⁰⁴ Hans Groot, *Van Batavia naar Weltevreden: het Bataviaasche Genootschap van Kunsten en Wetenschappen, 1778-1867* (Leiden: KITLV Uitgeverij, 2009).

¹⁰⁵ Mijnhardt, *Tot heil van 't menschdom*, 295-369.; Anonymous, 'Teyler' 1778-1978: *studies en bijdragen over Teylers stichting naar aanleiding van het tweede eeuwfeest* (Haarlem: Schuyt, 1978). An inventory of the archive can be found in Christine J. Ronnen, *Inventaris van de archieven van Teylers stichting te Haarlem, 1606-1945* (Rijksarchief Utrecht, 1978).

¹⁰⁶ Such as the 45 local physics societies counted by H.A.M. Snelders, "De natuurwetenschappen in de lokale wetenschappelijke genootschappen uit de eerste helft van de negentiende eeuw", *De negentiende eeuw* 7 (1983), pp. 102-122.

physics and on law were created,¹⁰⁷ Friesland,¹⁰⁸ and Gelderland at Arnhem,¹⁰⁹ to name just a few examples. These societies generally did not engage in active research, but filled their meetings mainly with lectures and demonstrations.¹¹⁰ Their eventual demise was a consequence of the fact that physics became simply too complex for such events. The disappearance of these smaller societies is more than a footnote in the history of science, for it denotes a more general trend in which amateurs were increasingly unable to participate in science due to its complexity as well as a conscious policy of exclusion by professional scientists. Towards the end of the eighteenth century, more specialized societies also started to appear: whether they were professional organizations, such as the society of Dutch chemists,¹¹¹ specialized artistic societies, focussing on music or architecture,¹¹² or societies for dilettantes, such as the historical society *Prodesse conamur*.¹¹³

Why did this torrent of societies suddenly appear after 1750? The most important reason was the rise of a new ideal of citizenship in the Dutch Republic, in which one could display civic virtue by contributing to halting the material and moral decay of the nation by engaging in useful science.¹¹⁴ Sociability itself – as shown above – had been a driving force behind societies for centuries, and it was less a change in the societies themselves, as it was a new way of thinking about nationality and citizenship, inspired to some extent by (Scottish) Enlightenment philosophy.¹¹⁵ Contributing to the national wellbeing did not necessarily have

¹⁰⁷ Adriaan Blaauw and Kees Wiese, *Een spiegel der wetenschap: 200 jaar Koninklijk Natuurkundig Genootschap te Groningen* (Bedum: Profiel, 2001); H.J. Scheltema, H.P. Bleeker, H.P. Coster and G. Overdiep, *Pro Excolendo Iure Patrio 1761-1961 : [gedenkboek ter gelegenheid van het 200-jarig bestaan van Pro Excolendo iure patrio]* (Groningen: Wolters, 1961); G. Overdiep (red.), *Acht Groningse juristen en hun Genootschap : 225 jaren Pro Excolendo Iure Patrio* (Groningen: Wolters-Noordhoff/Forsten, 1986); see also Lies Ast-Boiten, *Stad tussen Verlichting en Romantiek: Groningen 1780-1850* (Assen: Koninklijke Van Gorcum, 2011).

¹⁰⁸ Johan Frieswijk, *Genootschapscultuur in Friesland: het Fries Genootschap, 1827-2002* (Leeuwarden: Fryske Academy, 2002).

¹⁰⁹ A.M. van der Ven, “Het natuurkundig genootschap Wessel Knoop te Arnhem”, *Bijdragen en mededelingen Gelre* 89 (1998), pp. 165-194.

¹¹⁰ See Bernadette Bensaude-Vincent and Christine Blondel (eds.), *Science and Spectacle in the European Enlightenment* (Aldershot: Ashgate, 2008).

¹¹¹ H.A.M. Snelders, *Het gezelschap der Hollandsche Scheikundigen: Amsterdamse chemici uit het einde van de achttiende eeuw* (Amsterdam: Rodopi, 1980).

¹¹² Nicolle Klinkeberg, “Verenigd door de klanken der muziek alleen? Over muzikale genootschappen tussen 1770 en 1830”, in: Paul van Reijen, *Hef aan! Bataaf!* (Alphen aan de Rijn: Canaletto/Repro-Holland, 1997), pp. 33-53; Coert Peter Krabbe, *Ambacht, kunst, wetenschap: bevordering van de bouwkunst in Nederland (1775-1880)* (Zwolle: Waanders, 1998).

¹¹³ A.G. Schulte and G.B. Leppink, *Arnhem's Historisch Genootschap Prodesse Conamur 1792-1992: overal lieten zij hun sporen na* (Zutphen: Walburg Pers, 1992).

¹¹⁴ Rienk Vermij, “Nieuwe wijn in oude zakken? Iets over plaats en functie van genootschappen in de maatschappij van het ancien régime”, *Tijdschrift voor Geschiedenis* 112(1) (1999), 42-46.

¹¹⁵ See Wijnand Mijnhardt, *Tot heil van 't mensdom: culturele genootschappen in Nederland, 1750-1815* (Amsterdam: Rodopi, 1987); Ibidem, “Genootschappen en de Verlichting: een repliek”, *De achttiende eeuw* 26 (1994), 101-114. For a recent summary of the debate about the enlightened character of the society, see Jordy

to go through political involvement, it could also be achieved through being active in cultural and scholarly societies.¹¹⁶ The fact that societies appeared noticeably earlier in other countries has a lot to do with the decentralized political structure of the Dutch Republic, in which there was no national government that took the initiative to establish a national society.

In contrast to the HMW and especially the PUG, the Koninklijk Instituut (1808-1851) and its successor, the Koninklijke Nederlandse Academie van Wetenschappen (KNAW) has received substantial interest from historians, mainly because the society has sponsored a series of works on its own history.¹¹⁷ Based on the model of Napoleon's Institut de France, Louis Napoleon founded the KI in 1808, with a division into four classes: the natural sciences, Dutch literature and history, classical history and languages, and the fine arts.¹¹⁸ Unlike the HMW and PUG, the KI was an initiative of the state, although prominent Dutch intellectuals like Meerman, Van Marum, Van Swinden and Bilderdijk advised Louis Napoleon in establishing its regulations.¹¹⁹ In France, Napoleon's *Institut* had a utilitarian purpose, exclusively in service of the state, and predominantly focussed upon the natural sciences. Van Marum had a similar conception of science, but Meerman and Van Swinden stood for a more humanist ideal.¹²⁰ In 1851 this society was abolished by Thorbecke, who immediately

Geerlings, "Hoe verlicht waren de genootschappen? De achttiende-eeuwse sociabiliteit in recent historisch onderzoek". *Tijdschrift voor geschiedenis* 127(2) (2014), 189-209.

¹¹⁶Joost Kloek and Wijnand Mijnhardt, with the collaboration of Eveline Koolhaas-Grosfeld, *1800: Blueprints for a National Community*. Dutch Culture in a European Perspective, vol. 2. Translated by Beverley Jackson (Assen: Royal van Gorcum/Basingstoke: Palgrave Macmillan, 2004), 157.

¹¹⁷ See for a general and comprehensive history of the society Klaas van Berkel, *De stem van de wetenschap : geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*. Volume I, 1808-1914 (Amsterdam: Bakker, 2008). The series of commissioned works contain the following volumes: Bijdragen tot de geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen. Vol. 1: W. Otterspeer and J. Schuller tot Peursum-Meijer, *Wetenschap en wereldvrede. De Koninklijke Akademie van Wetenschappen en het herstel van de internationale wetenschap tijdens het Interbellum* (Amsterdam: KNAW 1997); Vol. 2: W.P. Gerritsen (ed.), *Het Koninklijk Instituut (1808-1851) en de bevordering van wetenschap en kunst*. (Amsterdam: KNAW, 1997); Vol. 3: P.W. Klein (ed.), *Een beeld van een academie. Mensen en momenten uit de geschiedenis van het Koninklijk Instituut en de Koninklijke Nederlandse Akademie van Wetenschappen 1808-1998*. With assistance of M.A.V. Klein-Meijer and I.J. van Houten (Amsterdam: KNAW: 1998); Vol. 4: P.E. Faasse, *Zuiver om de wetenschap: de Akademie en haar levenswetenschappelijke instituten* (Amsterdam: KNAW, 1999); Vol. 5: K. van Berkel (ed.), *Het oude Instituut en de nieuwe Akademie: overheid en wetenschapsbeoefening omtrent het midden van de negentiende eeuw* (Amsterdam: KNAW, 2000). A useful guide to the archives of some of these societies is Frans Willem Lantink and Jaap Temminck (eds.). *Wetenschapsarchieven in het Noord-Hollands Archief* (Hilversum: Uitgeverij Verloren, 2010). A useful orientation to the archives of the HMW and KNAW is provided by Godelieve Bolten, "Overzicht van wetenschapsarchieven in het Noord-Hollands Archief te Haarlem". In: Lantink and Temminck (eds.), *Wetenschapsarchieven in het Noord-Hollands Archief*, 83-110.

¹¹⁸ See for the activities of these four classes especially the articles in Gerritsen, *Het Koninklijk Instituut*.

¹¹⁹ W.W. Mijnhardt, "'Het Volk van Nederland eischt verlichting': Franse hervormingsijver en Nederlandse wetenschapsbeoefening (1795-1815)", in: Gerritsen, *Het Koninklijk Instituut (1808-1851) en de bevordering van wetenschap en kunst*, 11-37.

¹²⁰ See Johan Huizinga's early interpretation of the intellectual direction and importance of the KI/KNAW in the early nineteenth century in Johan Huizinga, "Van Instituut tot Akademie", in: Ibidem, *Verspreide opstellen over de geschiedenis van Nederland*, edited by W.E. Krul (Alphen aan de Rijn: Sijthoff, 1982), 211-234. For a

established its successor, what would become the KNAW, although he initially envisioned it as an exclusively scientific society, with no place for the humanities or arts. After strong protest, among others from G.J. Mulder (a chemist!), a section for the humanities was added as well in 1855.¹²¹ The fine arts no longer had a place, however. The amateurs, who had sat side by side with the professional scholars in the KI, were now ousted. In short, there were substantial debates within the KNAW in the nineteenth century about the direction the society should take.¹²² Because of its relatively close links to the government, a conception of (socially and materially) useful science was especially important in the first section, but the humanist ideal of the broadly oriented scholar lived on in the other sections. This simultaneous presence of very different ideas about science can also be detected in the archives of the PUG and HMW, to which we now turn.

contemporary evaluation of that interpretation, see Bert Theunissen, *'Nut en nog eens nut': wetenschapsbeelden van Nederlandse natuuronderzoekers, 1800-1900* (Hilversum: Verloren, 2000), 37ff.

¹²¹ See G.J. Hooykaas, "Thorbecke, het Instituut en de Akademie", in: Van Berkel, *Het oude Instituut en de nieuwe Akademie*, 11-38.

¹²² See Klaas van Berkel, "De Koninklijke Akademie en het Nederlandse 'wetenschapsbeleid' in Europees perspectief, 1851-1876", in: Van Berkel, *Het oude Instituut en de nieuwe Akademie*, 39-64.

Chapter Three - Provinciaal Utrechtsch Genootschap voor Kunsten en Wetenschappen

Somewhat surprisingly, no scholarly monographs about the history of the PUG exist, other than a thesis on the early years of the society.¹²³ In addition to that, we have an older work, more memorial book than scholarly monograph, written by the secretary of the society for its 150th anniversary in 1923.¹²⁴ This lack of attention is not entirely justifiable, especially if we compare it to the amount of literature written on the HMW, which is sizable in comparison, or the KNAW and its forerunners, which is huge compared to the meager output on the PUG. One might try to explain the scarcity of work on the PUG by pointing to the fact that it called itself a provincial society, and must therefore have been of relatively little importance. But as the archivist, historian and PUG-member Samuel Muller Fz. rightfully pointed out to the society at its yearly meeting in 1888: we have a society which “nagenoeg het eenige in ons vaderland is, wier ledental geen overwegend provinciaal karakter draagt.”¹²⁵ Not only was the PUG one of the most national of societies, it also stands out for keeping a very broad profile in terms of the subjects chosen for prize contests and debate: whereas the HMW turned exclusively towards the exact sciences during the nineteenth century, and other societies turned more towards the humanities (e.g. the Zeeuwsche Maatschappij der Wetenschappen), the PUG engaged in all those disciplines. The only other society to do this was the KNAW, although that society was divided into separate sections for almost the entire nineteenth century, while the PUG created those barriers later. One might argue that all of this only means that the PUG was an anachronism and not worth the attention given to it here, but that would be a view of history which only pays attention to tracing a genealogy of the present, while ignoring the many dead ends and twisting paths of development that were also taken. If the PUG represents one such dead end - it does not in a literal sense, for it still exists - is something I will come back to later, but even if it is, I think the aforementioned unique characteristics of the society make it worthwhile to study it. In the next section I will give a short sketch of the institutional structure of the society, before going on to give an answer to the questions posed in the introduction about the central figures in the society, the topics discussed, and the perceived goal and function of its work.

¹²³ Bertine Bouwman, *'Tot nut van het vaderland': de beginjaren van het Provinciaal Utrechtsch Genootschap* (s.l., s.n., 1989).

¹²⁴ N.J. Singels, *Uit de geschiedenis van het P.U.G. (Provinciaal Utrechtsch Genootschap), 1773-1923* (Utrecht: Oosthoek, 1923). In addition to an accurate overview of the history of the PUG, this book does contain a number of useful appendices that can be used for further research.

¹²⁵ UA, PUG, inv. nr. 74. He was right in saying this: all the yearly reports list new members, and although the number of them from Utrecht is sizeable, it is rarely, if ever, the majority.

3.1 Introduction and background

Historical background and development

The PUG only became the ‘Provinciaal Utrechtsch Genootschap voor Kunsten en Wetenschappen’ in 1778. It was founded on January 22 of the year 1773 as a ‘konstgenootschap’ with the motto “Besteedt den tijd/ met konst en vlijt”. The key figures in the foundation of the PUG were Laurens Praalder and Johan van Haeften. Praalder, the president of the society, was a typical representative of what was understood by art (‘konst’) in the early modern period: in addition to being a mathematician, which he taught in Utrecht at the Fundatie van Renswoude, a school for orphans, he was skilled in construction, cartography and navigation. Van Haeften, who functioned as the PUG’s secretary, was a lawyer working for the provincial court. It took a few years of discussion with the provincial authorities before the society was granted the right to its eventual title, partly because article 1 of the society’s regulations explicitly excluded theology as a subject of the society, while it did not place any other restrictions on topics:

Artikel 1. De verhandelingen, stukken, en berichten, die aan dit genootschap ingelevert, en toegezonden worden, zullen voornamentlijk tot doelwit hebben, het nut van het vaderland, en ook mogen behelzen wijsgerige, en economische onderwerpen: als meede alle nieuwe uitvindingen, en verbeteringen tot nut van de menschelijke maatschappij, en zoo voorts: allenelijk de godsgelerdheid uitgesloten; en de schrijvers zullen zich moeten onthouden, van hatelijke uijtdrukkingen dewelke den persoon beledigen wiens mening zij aantasten.¹²⁶

Eventually, however, things were smoothed over, and the society was not only officially recognized by the authorities but even received an official protectorate from Willem V.

During the French period the society temporarily changed its name to Utrechtsch Genootschap, dropping the ‘provincial’. The struggles between patriots and orangists reverberated in the society in other ways as well.¹²⁷ Founding members Praalder and Van Haeften were patriots, as were a number of others such as G. Doedes, A.H. van Eijck, G.A. Taets van Amerongen and A.S. Abbema. They resigned around 1785 and the orangist directors took over: Tydeman, Hennert, Luchtmans, and Rossijn. Indeed, in the early correspondence and jury reports, the names of the latter are much more frequent than the former.

The society was a broad one, focussing upon all the sciences, despite the fact that there were numerous more specialized societies in Utrecht, such as the literary society *Dulces ante omnie musae* (founded around 1760), a *Natuurkundig Gezelschap* (founded by PUG-member

¹²⁶ UA, PUG, inv. nr. 1. For an extended discussion of this article, see paragraph 3.4.

¹²⁷ See for these struggles: Bouwman, *Tot nut van het vaderland*, 68-69. The HMW also received very few entries in the years 1795-1797,.

Rossijn in 1777), and *Tandem fit surculus arbor* (1776), a student society focussing on law and antiquity. Finally, the PUG was to some extent a rival of the Utrecht branch of the Oeconomische Tak (1778), the offshoot of the HMW which focussed upon technical innovations that would improve the material wellbeing of the nation.

Institutional aspects

The PUG had different types of members, but the most important ones were the directors and the regular members. The directors made the decisions, such as which questions to pose for the prize contests, and deciding whether or not to award a medal, based on the advice of a jury, who were chosen from the regular members. Whereas the directors were usually chosen for their high social status, the regular members were meant to contribute to science, and were therefore chosen primarily based on merit (although obviously, in this period, most prominent scientists were part of the upper classes as well). Membership in the society came with certain obligations: the regular members were required to hand in at least one scientific essay a year (not necessarily on the prize contests, which was a separate institution). If they did not fulfil this requirement, they were to be fined 2fl.¹²⁸ This resulted in a veritable torrent of submissions in the early years of the society, but many members resented the system of fines and it was eventually abolished.¹²⁹

The members met once a year, in June, for the general assembly, where one of the directors held a speech in which the members who had died that year were commemorated. Later on, it also became customary for the speaker to open the proceedings with a speech of his own, which could reflect on the status and history of the society itself, or be a lecture on a topic of his expertise. After that, finances would be reported, as well as the state of the Museum for Antiquities that the society sponsored, the entries of prize questions would be discussed and new questions would be decided upon. In 1844 some members suggested the creation of a number of more specialized assemblies, which would meet a day before or after the general assembly, a proposal that was put into practice in 1845. There were three sections: one for the natural sciences and medicine, one for literature, philosophy and history, and one for law and political science. Some members of the section of natural science even proposed to move the judging of the prize contests to the section in which they belonged:

¹²⁸ The system of fines was quite elaborate. Submitted pieces were circulated, for example, and if one did not send the piece back in time, or waited too long with writing one's advice, there were also financial consequences.

¹²⁹ The internationally renowned Dutch scientist Petrus Camper complained for example that such a system of fines was not in place in any other society. See Bouwman, *Tot nut van het vaderland*, 11.

ten einde daardoor vooreerst meerdere discussiën over de hierbij voorkomende zaken uit te lokken; ten andere het oordeel zaakrijker te doen worden, dan nu bij eene zoo gemengde vergadering mogelijk is; en eindelijk om de Leden des Genootschaps, die eene andere rigting aan hunne studiën geven, dan die, welke tot het beoordeelen van voor te dragen adviezen - somtijds op specialiteiten van eene wetenschap betrekking hebbende - gevorderd worden, van de aanleiding te ontslaan, om eene stem uit te brengen, over onderwerpen, die hun vreemd zijn.¹³⁰

This proposal did not make it in the end. Still, the meetings of the different sections were quite popular and clearly filled a need.¹³¹

The prize contests

The prize contests were held from almost the beginning of the society's existence until they were abolished around 1900. The main motivation behind them was the conviction that it was hard to for individual scientists to publish their research, as they were often not affiliated to a university and thus without the means to finance publications of large folio volumes of research. Through the membership fees paid by the directors, the PUG was in a position to advance science by publishing new research. Initially, only one or two questions a year would be published. Since the questions often received no answer, the number of questions was gradually increased over the years.¹³² Furthermore, rather than repeating the question just once before rescinding it, it became customary to leave the questions open for answers indefinitely.¹³³ Consequently, later in the nineteenth century, one could still try to win a prize for a question that was initially posed twenty years earlier.¹³⁴

Another problem with the prize questions was their specificity, which made them less likely to find an able and willing respondent. For that reason, sometimes a very general question was proposed, e.g. in 1807 one asking for “een of ander stuk uit het vak der *Vaderlandsche Oudheid- of Geschiedkunde*” and one requiring “een of ander stuk behoorende tot de *Staatkundige Huishoudkunde (Oeconomia Politica)*”.¹³⁵ This opened up the competition to anybody working in these fields and a potentially higher return. The questions themselves could vary greatly in length: one question about cancer had received answers whose authors did not seem to understand the exact intent of the question: in its final form,

¹³⁰ UA, PUG, inv. nr. 77, p. 44.

¹³¹ Singels, *Gedenkboek PUG*, 98-101.

¹³² Unanswered questions were not necessarily a failure, as Lintelo de Geer argued in 1856: at least they had served to identify an unexplored problem and might therefore draw the attention of scientists to these urgent questions. These questions could function as a signpost of sorts, pointing in the direction in which science should go. (UA, PUG, inv. nr. 71).

¹³³ E.g. in 1822 there were 26 new questions, in addition to the 23 still open from earlier years.

¹³⁴ Although not all questions were continued in this manner: sometimes the progress of science made them obsolete and each year the general assembly and later the different sections would decide which questions to add and which to remove from the list of open enquiries.

¹³⁵ UA, PUG, inv. nr. 68.

the question, with an exact list of requirements, took up two full pages in the yearly program of the society. Other questions were extremely concise: “Eene geschiedenis der heerlijke regten in ons land”, or: “Eene geschiedenis der Joden in Nederland” for example. Formulated like that, an interested scholar could only guess at the exact intentions behind the question, making it less likely to meet them and therefore less attractive to compete.

The procedure of the prize questions was designed to guarantee impartiality. The questions themselves were submitted by the members, after which a shortlist was created from which the yearly general assembly chose a few questions which were then advertised in a number of prominent magazines and papers.¹³⁶ If a question received a winning entry, the drafter of the question won a silver medal: coming up with the right questions was a valued contribution to science in itself. Both members and non-members were allowed to submit essays, but they had to be copied by a different person to ensure that none of the advisers would recognize the handwriting. Name and address of the contestant were to be written on a separate, sealed piece of paper, which was only opened in case the entry was awarded a medal. If not, these tickets (called ‘biljetten’) were burned, sparing the author the ignominy of being known as the writer of an inadequate essay, which could be very welcome, given that the advisers usually did not hold back in criticizing insufficient essays.¹³⁷

The review procedure went as follows: the directors appointed three advisers to write a report on the piece, which were then read at the yearly assembly, after which the verdict was given.¹³⁸ Since the reports of the jurors could be very lengthy (sometimes giving extended summaries and detailed commentary), this time-consuming process was eventually changed and the directors wrote a so-called pre-advice in which they summarized the conclusions of the three advisers and proposed a gold medal, a silver medal, or no prize at all. One major innovation was introduced during the nineteenth century: instead of completely putting aside an insufficient essay, those that were promising but not quite good enough received the (anonymous) reports of the jury, which they could use to amend their pieces and resubmit them. This was clearly more beneficial to science than discouraging the authors of decent

¹³⁶ In the cases of the PUG, these were the *Utrechtse Courant*, the *Haarlemsche Courant*, the *Gazette d’Utrecht* and the *Kunst en Letterbode*. In addition to that, these questions must have been published in international newspapers, because every now and then there would be a winning entry from outside the country, usually from Germany, but sometimes also from France, and in one case even from the United States. See for a list of early concept questions UA, PUG, inv. nr. 192.

¹³⁷ It should be noted that the directors often found that, upon opening the *biljet* of a winning entry, no name would be inside and the society would have to ask in its programme if the author would be so kind as to identify himself to the society.

¹³⁸ Occasionally, the reviewer turned out to be familiar with the writer of the question (in the small world of Dutch science, this was almost inevitable) in which case he would decline the appointment in the interest of a fair and impartial review.

essays from pursuing science any further by rejecting their entries altogether. It is part of a development in which the society put more emphasis upon collaboration between scholars and their institutional role of facilitating this sort of mutual instruction. As such, it can be seen as part of a broader trend of the professionalization of science.



Figure 3. The medal, representing Minerva under the so-called Oranjeboom, with the city of Utrecht in the background and surrounded by instruments of science.

3.2 What is science? Topics and criteria of ‘good’ science

The topics of the prize questions can be divided roughly into five categories: questions relating to practical and technical problems, ‘purely’ scientific questions, medical questions, questions relating to ethics and politics, and questions on history and philology. In the following sections, I will give an impression of the questions asked within these categories, before giving an overview of the criteria used in judging entries on those topics.

Technical and practical questions of national interest

Many questions were posed, in which the PUG functioned as a voluntary advisory board to the government: these could include topics relating to water management (even more popular in the HMW), the best way to deal with diseases that were ravaging the country, vaccination (a big issue around 1800), ways to safely store gunpowder, and more.¹³⁹ These were the type of questions with which a society like the *Bataafsche Genootschap* exclusively concerned itself. To give some examples from the PUG, in 1808 the society asked for the best way to build houses of correction “ten einde dezelve op de minst kostbare wijze meest tot verbetering van de Zeden der Tuchtelingen strekken kunnen”.¹⁴⁰ Another question concerned ways to ascertain the quality of bread and catch bakers who cheated their customers by selling them poor quality bread. Many technical questions had to do with ships and navigation. Among them were questions about improved barometers and the influence of iron cannons or the weather on magnetism and consequently the compass. In 1824, there were also some questions about steam power, although – in a symbolic meeting of the old and the new – the same year also had a question concerning ways to improve the efficiency of the *trekschuit*, on the request of the city of Utrecht.¹⁴¹ In 1825, questions were asked about the substitution of gum Arabic by sulphuric acid in the industrial processing of wood, as well as questions about an English procedure for digging wells without getting brackish water, a question about the construction of bridges over waterways where large ships passed by, and so on. These kinds

¹³⁹ The question about gunpowder led to a number of entries over at least a decade: it was first published in the early 1820s and was still going in 1836 when it led to a major conflict between the writer and the reviewer. The writer had returned the jury report he had received and had given detailed critique of that report in turn. He did this because he was furious at the hyper-critical review he had received: “Is het woord *beoordeling* hier wel juist? Zoude *bittere bedilling* niet eigenaartiger met den inhoud overéénstemmen? Trouwens, de *humor* en grimmigheid welke overal doorstraalt, laten niet onduidelijk eene personeele wrok kennen en het voornemen om in *allen gevalle* af te keuren.” (See UA, PUG, inv. nr. 250. Italics in original) It seems the writer was partly at fault for he had attacked the incompetence of the Dutch military engineers, and the reviewer of this question was probably H.G. Seelig, a distinguished member of the artillery.

¹⁴⁰ UA, PUG, inv. nr. 68.

¹⁴¹ The reviewers were acutely aware of the outdated nature of the question, and complained that an investigation into ways to make the *trekschuit* more comfortable was not exactly of the sort that would contribute to the greater glory of the society and science itself.

of examples can be multiplied for later years, but the general character will be evident from these questions.

During the course of the nineteenth century, this category of questions became less important, but they did not disappear altogether. In 1834, for example, a question was judged concerning the feasibility of constructing a series of canals in Drenthe in order to stimulate the economy of that backward region and integrate it into the Dutch economy. And in 1862 the jury reviewed an entry on ventilation: the question had a chemical component by asking about the deteriorating quality of the air in a closed room, as well as a practical dimension, in that it asked for a device that could refresh the air in such a room. Interestingly though, the writer was criticized for having neglected to consult a technician who could have helped him design such a device: apparently it was no longer expected of this theoretically competent writer that he was also able to treat the practical side of the question. Something of a division of labour between theory and practice becomes visible here.¹⁴² It illustrates the fact that technical experts working outside the university had much less of a place within scientific societies around 1850 than they had had fifty years earlier and that a scientist was increasingly seen as someone exclusively concerned with more theoretical issues.

After 1850, the only technical questions appeared in 1876, when the PUG asked for ways to purify river water into drinking-water. The writer was explicitly required to add an estimation of the costs involved, which clearly indicates the purpose of the question. A question from 1892 seems to take us back in time even more: “In welk opzicht kan de tot dusver verkregen bacteriologische en scheikundige kennis in praktijk worden gebracht ten bate van de zuivelbereiding?”¹⁴³ This question even led to a very insufficient amateur entry, something that had become entirely unusual during the nineteenth century. The two entries both tried to provide a manual for dairy production with a scientific underpinning. This combination of theoretical insight with a practical application was standard practice in the eighteenth century in both PUG and HMW, but had become something of an oddity in the late nineteenth century. In general, in the earlier period no strong distinction between the scholar and the artisan seems present in the PUG: working with material objects and manipulating matter is as prestigious, and probably more useful, than the scholar’s verbal products.¹⁴⁴ Over the course of the nineteenth century, and not just in the PUG, this respect for what Pamela Smith has called an ‘artisanal epistemology’ largely disappears.

¹⁴² UA, PUG, inv. nr. 253. Letter by Von Baumhauer dated 10-03-1862.

¹⁴³ UA, PUG, inv. nr. 257.

¹⁴⁴ See Smith, *The Body of the Artisan*, 8.

Scientific questions

Purely scientific questions were less dominant in the PUG than in the HMW, but they were not neglected by any stretch of the imagination, especially in the nineteenth century. But even before that, some of the members were very much aware of the latest developments in science, and wrote questions about Herschel's observations in astronomy, or the experiments by Oerstedt, Ampère and Arago on magnetism and electricity in the 1820s. Sometimes scientific questions with a clear theoretical component were combined with a practical goal. Such were the questions about the geology of the Netherlands: these were questions about the origins of the sand hills and boulders in the Dutch landscape, or about the different types of clay soils. Usually these questions were posed with the objective of finding ways to make these areas more fertile and economically productive, but in the process a lot of geological information about the Netherlands must have been gathered. The same goes for questions about different breeds of sheep, or horses, which delivered more than just zoological knowledge.

Later on, what is sometimes called the Second Golden Age of Dutch science originated among scientists at Utrecht University in the 1840s. Since many of these scientists became members of the PUG, they brought with them their own views on the proper character of science, and their influence was felt in some of the later questions. One area in which the PUG contributed to pure science was in the 1859 question on the developmental history of a species of marine fauna, specifically molluscs, crustaceans or annelids. This led to an 1861 entry by René-Edouard Claparède, a Swiss zoologist, on the development of spiders *in ovum*. Strictly speaking, spiders did not fall under the required animals, but the reviewers were so unanimously impressed with the entry that it was published nonetheless. According to anatomists like Willem Berlin and M.C. Verloren van Themaat, publishing this in the transactions of the PUG would substantially increase the international prestige of the society and be of great service to other scientists. This question was exemplary for a less utilitarian approach to science, which could lead to criticism. Verloren reflected on people who might be sceptical about an investigation into the growth of spiders:

Moge de oningewijden welligt niet inzien, waarom den ontwikkeling der spinnen zoo groot belang kan hebben? Ik wil antwoorden, dat elk wetenschappelijk onderzoek altijd belangrijk is, dat men vooraf niet kan bepalen tot welke gevolgtrekkingen het zal voeren, dat het eene wordt opgehelderd door het andere, dat de natuur een is en slechts wordt begrepen door haar van alle zijden te bespieden en te doorzoeken, dat juist de verscheidenheid door vergelijking aanleiding geeft om haar te verstaan en te begrijpen.¹⁴⁵

¹⁴⁵ UA, PUG, inv. nr. 253. Letter dated 07-04-1861.

Even without a direct applicability, knowledge might turn out to be useful in the long run, and even if it will not, understanding nature is a worthy goal in itself, which is not in need of further justification. The proponents of science as an activity pursued by a very broad national public in the service of that nation, would surely not have liked this conception of science: it was the prerogative of a small group of professors and did not reach, nor was it interesting to, a general public.

A number of other entries on the same questions were received,¹⁴⁶ and more questions were posed of a purely scientific nature, e.g. about the ‘body temperature’ of plants (which led to an entry which consisted of a series of detailed tables with the results of experiments on a lime tree in 1862) and a similar question about the amount of water plants evaporated under different circumstances. A typical question in this regard is this one posed in the late 1860s: “Het Genootschap verlangt door naauwkeurige proefnemingen uitgemaakt te zien, in hoeverre de verbindingswarmte van ozon eene andere is dan die van gewone zuurstof.”¹⁴⁷ The explicit requirement of precise measurements and experiments was a recurring element of scientific questions in the second half of the nineteenth century. The questions could also be of a more theoretically sophisticated nature, however, such as the 1889 question about the hereditariness of acquired qualities.

At the close of the nineteenth century, the juridical section of the PUG, published two questions which concerned pressing legal problems that were highly topical. The first question, first posed in 1895, concerned the involvement of laymen in lawsuits, presumably as jury members, the other in, in 1900, asked for legislation surrounding employment contracts. These questions clearly reflect the social and legal issues of the day and therefore are a reflection of the fact that the idea of useful science had not disappeared entirely. At the same time it signifies the maturation of law as a scientific discipline, because the large majority of legal questions in the PUG and HMW were of a legal-historical nature.

¹⁴⁶ In one case in 1868 Verloren remarked upon the fact that the author was such a close follower of the German zoologist Ernst Haeckel. He would have found this rather obvious if he had known that Haeckel himself *was* the writer of the entry. This just goes to show that the reviewers really were kept in the dark as to the names of the writers. It also shows that a relatively prominent scientist as Haeckel or the Swiss Clapayrède were aware of the prize questions of the PUG and took the trouble of participating in their contests, which says something about the importance and prestige of the society.

¹⁴⁷ UA, PUG, inv. nr. 254.

Medical topics

Besides technical topics, medical questions were an important category, relatively separated from the other topics.¹⁴⁸ Professionalization of medicine had taken place earlier than in other disciplines, and the judges of medical entries were always active in the profession themselves. As far as the criteria for a good medical essay are concerned, it could be enough to simply report on a very curious case. In 1779, for example, all reviewers were in favour of publishing a report on the curious case of the 70-year old Elsje Geerts, breastfeeding her grandchild.¹⁴⁹ There are more examples of such medical anomalies, such as unusual bone fractures, that are published simply for their uniqueness, and possibly because of their curiosity value.¹⁵⁰ Yet not everyone agreed on this: an essay describing an unusual and extreme case of epilepsy was judged by one reviewer to be rare indeed and consequently worthy of publication but he also thought that

de meededeeling van deeze waarneming evenwel van ongelijk veel grooter en uitgestrekter nuttigheid zoude kunnen zijn, wanneer men de aanleidende of naaste oorzaken der toevallen op goede gronden in dezelfde vindt aangetoond; en indicatieën ter geneezing gemaakt zag, welke, als gegrond op eene naauwkeurige kennis der oorzaken, eene gelukkige geneezing hadden ten gevolge gehad.¹⁵¹

Describing a curious case was interesting in itself, but without an analysis of its causes and indications as to its possible cure, it was of relatively little value to the medical community. The other reviewer agreed with this sentiment: “Als men soortgelijke gevallen aan ‘t publiccq wil voorstellen, heeft men in eene uitgebreide practijk zeer dikwils gevallen, die vrij merkwaardigen zijn, maar die men te-rug houd, om dat er geen nuttigheid in is: en *het nut* voor de maatschappij geen eige eer moet ons voor ‘t publiccq doen schrijven.”¹⁵² Getting a name for oneself by providing spectacular and apparently entertaining medical anomalies was not the purpose of a true man of science. Here we see a tension between the goal of writing for the public at large, and that of instructing one’s medical colleagues.

¹⁴⁸ See Frank Huisman, “Medicine and Health Care in the Netherlands, 1500-1800”, in: Klaas van Berkel, A. van Helden and L.C. Palm, *A History of Science in the Netherlands: Survey, Themes, and Reference* (Leiden: Brill, 1999), pp. 239-278, as well as the work of M.J. van Lieburg, e.g. M.J. van Lieberg, “Geneeskunde en medische professie in het genootschapswezen van Nederland in de eerste helft van de negentiende eeuw”. *De negentiende eeuw* 7 (1983), pp. 123-145; and ibidem, “Martinus van Marum en de geneeskunde”. In: A. Wiechmann and L.C. Palm, *Een elektriserend geleerde: Martinus van Marum, 1750-1837* (Haarlem: Enschedé, 1987), pp. 183-222.

¹⁴⁹ UA, PUG, inv. nr. 241. Entry marked 74.

¹⁵⁰ Rudolph Forsten, reviewer on such a case, argued in favour of publication “als behelzende eene vrij nauwkeurige beschrijving van eene speeling der natuur, die zeer zeldzaam is, en van alle de tot hier toe beschreeven gevallen, van dat soort, verschild, waardig door den druk gemeen gemaakt, en dus der vergetelheid onttrokken te worden”. UA, PUG, inv nr. 242. Letter dated 23-04-1784).

¹⁵¹ UA, PUG, inv. nr. 242. Letter dated 28-01-1785.

¹⁵² UA, PUG, inv. nr. 242. Letter dated 10-01-1785, italics in original.

It is also noteworthy that medical treatises were supposed to be business-like: an early prize essay (1782) about nervous illness could – and did – lead to moral digressions on the excessive consumption of food or alcohol, which was not appreciated by J. Veirac and L. Bicker, the reviewers. Bicker judged one of the entries as quite excellent, although “over ‘t geheel is het te wijdloopig geschreven, heeft veele onnoodige moraale en spectoriaale uitweidingen.”¹⁵³ This was a rather striking comment, since Bicker was commenting here on his own entry! He had written one of the submissions and had subsequently been commissioned to review them, a commission which he should have refused, but apparently did not in the hopes of increasing his chances of a medal. Given this curious fact, we should maybe take his self-castigation with a grain of salt, but Johannes Veirac also remarked on the inappropriateness of this sort of moral sermons in medical treatises.¹⁵⁴ It is interesting for the history of medicine though, how often physical diseases were connected to psychological causes. In the essays on a question about meningitis, the writers also paid attention to child-raising, which was apparently seen as something that could influence its occurrence. The fact that such moral exhortations were common in medical essays is further proof of the fact that eighteenth-century science had a much closer connection to the general public than it has since had. This medical research was done thinking about the good of the general population, and in some cases even seems to have been intended to be read by them.

Over the course of time, statistics became increasingly important in medicine and other disciplines. In 1828 a medical question was posed related to infant mortality surrounding childbirth: the first of the multiple questions asked was: “Kan men uit de statistieke opgaven met genoegzame zekerheid opmaken, dat het aantal dood geboren, of binnen de eerste vier en twintig uren na de geboorte gestorvene kinderen, in de laatste jaren in ons land aanmerkelijk is toegenomen?”¹⁵⁵ This question signifies an increasing stress on the accumulation of serious datasets, which we can see both in the PUG and the HMW during the nineteenth century. At this early point in time, the contestant, the Amsterdam surgeon and obstetrician J.N. Engeltrum, had to conclude that not enough data was available to draw any warranted conclusions in the matter. In a similar question about the occurrence of *Delirium tremens* in the country, the PUG asked whether the number of cases was really increasing, or whether this was just a perception due to the increasing amount of literature on the topic, an

¹⁵³ UA, PUG, inv. nr. 242.

¹⁵⁴ Although Veirac added that Bicker had omitted moral reflections in the one place where they would have been appropriate: in analysing extramarital affairs as causes of nervous illness. Veirac saw this omission as caused by a religious sensibility that was out of place in a medical treatise.

¹⁵⁵ UA, PUG, inv. nr. 69.

accurate awareness of potential bias. In 1879 the PUG sent a petition to the king asking for the establishment of a national institute for statistics, something they had already proposed in the 1850s. An interest in statistics had clearly been a key element of the PUG's ideas about science for decades.¹⁵⁶

Another new type of question – introduced in 1836 – asked for a medical topography of a Dutch city, reflecting the belief that local conditions such as air quality had a huge impact on the level of health. This was a question that would receive multiple answers throughout the century.¹⁵⁷ In general, both in the PUG and in the HMW, a significant amount of medical questions was concerned with contemporary diseases afflicting parts of the Dutch population. One example is a question about an increase in cases of ophthalmia in the army. In 1824 another, both medically and socially important, question was reviewed which asked for ways to convince the many people reluctant to cowpox vaccination to accept it: it was not a question so much about the medical aspects, as it was about the social issue of implementing a health measure that a significant part of the population did not want.¹⁵⁸ The writer and reviewers mainly discussed how the government could reach the common people: the written word (simple books, almanacs) could be used, but due to the still numerous analphabets in the countryside, the most promising way seemed to be through the spoken word of the local ministers, who held a lot of authority and could remind parents of the utility of vaccination from the pulpit. Note that the proponents of this solution assumed that the ministers would take a more enlightened stance on vaccination than their congregation: since the objections against it were religiously motivated one would expect the ministers to be the last figures who could be useful in convincing the people that it was a good idea. In proposing this solution, therefore, the writers either showed a large degree of naivety and a lack of knowledge about the local situation (the entries were mostly from Germany) or they thought that the ministers, belonging to a somewhat higher social class than their flock, would take a more modern stance on the issue of vaccination. Strikingly, the reviewers and the writer also shared a belief that besides religious and superstitious reasons, another impediment to the implementation of vaccination was the fact that the common people cared less about their children than those better situated. Finally, the reviewers agreed that the proposed solution (persuasion through personal contact) was not feasible in large, impersonal cities but only in the countryside, a difference that the writers had not accounted for.

¹⁵⁶ See UA, PUG, inv. nr. 73, yearly assembly 1879.

¹⁵⁷ I.e. about Utrecht in 1843, Maastricht in 1863, Leeuwarden in 1868 and Venlo in 1889.

¹⁵⁸ See UA, PUG, inv. nr. 246 for the reviews of this question.

Questions about ethics, education, and economy

In addition to technical topics of a practical nature (water management, agriculture, trade and industry), scientific, and medical questions, a fourth category of questions, especially popular in the decades around 1800, was concerned with moral and pedagogical issues. According to H.C. Cras, a praiseworthy entry in ethics had to meet one of the following conditions:

De voortreffelijkheid van een zedekundig geschrift zal bestaan of 1) In de nieuwheid van nuttige zedelessen zelve; 2) In de nieuwheid van bewijzen voor reeds bekende zedelessen; of, 3) schoon reeds en de lessen, en de bewijzen bekend zijn, in een kort, klaar, bondig betoog, waarop reeds bekende zedelessen meermalen met nut kunnen worden voorgedragen; of eindelijk 4) In den sierlijken voordragt, waar door de schrijver de lezers hart ontvlamt, en tot het bewagten der zedelessen, welke men te voren slegts bij wijze van beschouwing kende, overrecht.¹⁵⁹

Evidently, Cras was of the opinion that a moral essay is written for a larger public, for even if it contained nothing not already known, it could deserve a prize if it had the right motivational force. One moral question that was immensely popular was an enquiry into the best way to handle the practice of duelling that was still common in other cultures. It led to 41 entries. This category therefore exemplifies especially the utilitarian vision of science, and shows that utility was not understood in a narrowly material sense but also in an ethical sense. Improving morality, child-raising, and education, were perceived as being highly useful to the nation and therefore legitimate exercises of a scientific society around 1800.

Questions in this category were often highly ambitious and wide-ranging. A political question concerning which criminal acts were most damaging to the state, elicited the critical response by the reviewers that it was a vague and broad question. As Allard Hulshoff put it: “Op zulke algemeene vraagstukken, verwacht ik nooit veel nieuws ter uitbreiding onzer kundigheden.”¹⁶⁰ One relatively popular contest asked: “Welke is de invloed van het gevoel voor het schooner op de zedelijke volmaking des menschen?”. Another one went:

Is het hoogste doel van den Staat beveiliging van leven en van bezitting en vermeerdering der middelen, welke tot onderhoud en veraangenaming van het leven kunnen dienen; of is er een hooger doel in de zedelijke natuur des menschen gelegen, en zoo ja, tot welke in het bijzonder voor het Staatsregt gewigte, besluiten geleidt hetzelve?¹⁶¹

Similar philosophical questions were asked about freedom and determinism at the end of the eighteenth century. However, as one anonymous reviewer wondered, was this really what would interest the Dutch public? “Immers, het is bekend, hoe wynigen er zyn onder hun, die Hollandsche schriften leezen, die eenig belang stellen in afgetrokkene, bovennatuurkundige

¹⁵⁹ UA, PUG, inv. nr. 242. Letter dated 02-01-1784.

¹⁶⁰ UA, PUG, inv. nr. 243. Letter dated 23-10-1794.

¹⁶¹ UA, PUG, inv. nr. 69.

betrachtingen.”¹⁶² On the other hand, this unfamiliarity could be the very reason to publish it. H.C. Cras thought a later entry worth printing exactly because it would familiarize the Dutch public with the new German philosophy, in this case that of Fichte.¹⁶³ A similarly abstract and philosophical question about the use of final causes in biology was even quite popular.¹⁶⁴ Also interesting is the question reflecting on the future of disciplines themselves by asking whether physics and psychology would, in the future, be regarded as closely related disciplines with the same common ground, or whether they were set on an entirely different footing. A similar question was posed about the relation of philosophy to mathematics. This shows that disciplines were not set in stone in this period, and scholars were reflecting upon the course some disciplines would take in the future, and apparently envisaged the possibility of certain disciplines merging because they were connected through an underlying unitary method.

Just like the HMW, the PUG also posed a series of pedagogical questions asking for the best way to raise and educate children. Part of this was the enquiry – also posed in the HMW – what role Latin had to serve in education: which subjects should be taught in Dutch and which in Latin? Another interesting question was posed in 1823 about the right education for children who were destined for a life as merchant or industrialist: in earlier times they just needed to learn the job itself, but in these modern times, children needed a general education, not least because the profession of merchant or industrialist had become more complex.

Historical and classical questions

Prize contests on history and classical philology were relatively rare in the early history of the society. E. Wassenberg, a classicist who had written his required yearly piece on Martial, asked if he was allowed to publish it elsewhere, since he did not think it likely that he would reach his intended public by publishing in the transactions of the PUG, which focussed so much on physics and medicine, saying: “Mijne verwachting was, dat er meer taal en oudheidkundige schriften van tijd tot tijd zouden inkoomen en geplaatst worden.”¹⁶⁵ However, this changed during the course of the nineteenth century. For one thing, increasing attention to the importance of archives and archival studies in history is apparent. In 1836 a question was posed on the best way to prevent the physical degradation of old charters and documents in storage. In many jury reports on historical questions, the reviewers deal at

¹⁶² UA, PUG, inv. nr. 243. Letter dated 16-03-1799.

¹⁶³ UA, PUG, inv. nr. 243. Letter dated 27-12-1807.

¹⁶⁴ It also created a lot of confusion and some controversy, because some advisers suspected that this question tried to undermine their physico-theological beliefs. See the letters by Clarisse in inv. nr. 244.

¹⁶⁵ UA, PUG, inv. nr. 242. Letter dated 20-12-1789.

length with the (insufficient) use of archival sources, and an author making good use of available material, had a good chance of taking the prize.

One special type of historical question, seen especially in the second half of the nineteenth century is the biography of a famous man of science who had died in the eighteenth or early nineteenth century. In this way, the PUG contributed to strengthening the identity of the men of science as a group by discussing the lives of eminent predecessors, not in the least because these biographies would (implicitly) present a model of the virtues of a good scholar. Not many scholars would take upon themselves the task of writing a substantial biography like that, unless prompted by the honourable prospect of winning a prize contest. This was a way to keep the institution of the prize questions relevant during the nineteenth century, as J. van Hall told the PUG in 1855.¹⁶⁶

Another popular topic, related to the perceived economic decline of the Republic, was that of the commercial history of the Netherlands in various parts of the world.¹⁶⁷ This was a question that occupied more Dutch thinkers around this period: Thorbecke proposed a similar question in 1848 in the HMW about the commercial relations with Germany and ways to improve them.¹⁶⁸ In general, the historical questions focussed upon Dutch history, although this did not necessarily come at the cost of impartiality. One contestant in a church-historical question was chided by the reviewer for letting his Protestant convictions weigh through in his all too negative commentary upon Roman Catholics.¹⁶⁹ Sometimes a historical question would have a larger scope, such as the question about the value the invention of the printing press had had for the enlightenment of humankind, upon which a winning entry was received by the G.J.M. Delprat, minister of the Walloon church. History could also function as a source of useful lessons: in 1819 a question was posed which asked for an historical overview of attempts to improve the moral and physical situation of the different social classes, with the goal of judging which measures had been historically proven to be efficient. No theory was required, but exclusively historical facts, also of failed attempts at social engineering, because these were just as instructive as successful ones.

¹⁶⁶ UA, PUG, inv. nr. 71.

¹⁶⁷ Towards the end of the nineteenth century, these questions were still posed, but the moral concern about decline disappears and is replaced by a more disinterested perspective on the commercial history of the Netherlands. See e.g. the 1881 question about the trade relations between the Republic and the Barbary coast; the 1885 question about the history of the colonies Berbice, Essequibo and Demerara; and the 1895 question about the influence of refugees from the Southern Netherlands upon trade and industry in the Dutch Republic.

¹⁶⁸ See De Bruijn, *Inventaris van de prijsvragen*, 331.

¹⁶⁹ UA, PUG, inv. nr. 243. Letter by Heringa dated 23-01-1809. It was literally stated in the rules of the society that entries were not allowed to be insulting to anyone – this entry apparently was.

A substantial amount of historical questions related to the medieval and earlier Dutch history were asked, on topics such as the Hanseatic League, the Viking raids, the Brethren of the Common Life, or the history of Frisian commerce before Charlemagne.¹⁷⁰ There were also questions on the history of specific groups in the Netherlands, such as the Jews (with an entry by H.J. Koenen) and the gypsies (called *heidenen* or *indiërs*, for their presumed origin), answered by Jacob Dirks with an entry noteworthy for its extensive use of archival materials.¹⁷¹ In 1848, a question was reviewed concerning the anatomical discoveries made in the Northern Netherlands until 1700. Interestingly, Schroeder van der Kolk criticized the entry for not limiting itself to anatomists, but also including doctors, surgeons, and obstetricians. This seems less the fault of the author than an anachronistic projection of Schroeder van der Kolk, who apparently projected the more separated disciplines of his era back in time. These questions were all posed in the late 1830s and 1840s and are usually very vague, asking for ‘a history’ of the topic. There was some development in this regard, however. The historical question posed in 1872 asked for a critical history of the influence of magazines like the *Spectator* upon the domestic, social, and religious life of the Dutch in the second half of the eighteenth century. This question was clearly more defined and to the point than the earlier ones. A similar point can be made for the 1889 question concerning the influence of Seneca’s tragedies upon Dutch theatre in the seventeenth century. In the 1850s, a number of biographical questions were posed on Justinus van Nassau, G.K. van Hogendorp, and Gerhard Dumbar, as well as R.H. van Goens and Willem Blaeu in the 1860s and Petrus Wesseling and Louis de Beaufort in the early 1870s.¹⁷² Royaards acknowledged this increase in interest for Dutch history, although he also noted that many gaps remained.¹⁷³ In general, this surge in interest in national history around the middle of the nineteenth century was clearly part of a broader European trend, connected to the rise of nationalism.

¹⁷⁰ The questions of the law-section were also predominantly concerned with the national legal history.

¹⁷¹ As reviewer Nijhoff noted, Dirks used data from the “Resolutieboeken van Ridderschap en Steden en der Gedeputeerde Staten van Overijssel, uit de Registers des besluiten van de landschap Drenthe, uit de Handelingen der Staten van Friesland, uit de criminele acten en sententieboeken der Hoven van Holland en van Friesland, uit de besluiten der synoden van Overijssel en van Groningen, uit stedelijke of kameraarsrekeningen van Deventer, Utrecht, Haarlem, Gouda, Middelburg. [...] Men staat verbaasd bij de beschouwing van de rijken voorraad, door den schrijver uit deze en andere verspreide, onuitgegeven en niet ten allen tijde toegankelijke stukken, te zamen gebragt”. UA, PUG, inv. nr. 252. Letter dated 29-01-1848. Incidentally, H.A. Hamaker drafted a similar question in 1835 for the HMW, which received no entries.

¹⁷² The questions about Van Hogendorp and Blaeu also explicitly asked for an evaluation of their contribution to political economy and geography, respectively. For the question about Wesseling, Suringar specified the criteria he used in judging: the essay should display knowledge and judicial use of all the relevant sources, contain a full portrait of the life and merits of the subject, and be well-ordered and well-written. See UA, PUG, inv. nr. 255. Letter dated March 1873.

¹⁷³ UA, PUG, inv. nr. 251. Letter dated 14-02-1842.

Throughout the nineteenth century, the PUG had a vital tradition of classical and philological questions, which were posed and answered in Latin. One of these involved a translation of at least two books from Herodotus. Taking up such a big task with a very uncertain prospect was not very attractive to experienced scholars, so it is perhaps not surprising that the entries were mainly written by university students of the classical languages.¹⁷⁴ Of the other classical questions, many of the winning entries were written by the headmasters of Latin schools – men who had received an education in the classics and apparently had time to spare and were insufficiently challenged by their day jobs.¹⁷⁵ They could follow their own tastes as well, since besides more specific questions, the PUG also posed very general questions, such as the following query: “Animadversiones in antiquum scriptorem, sive Graecum sive Latinum, quibus ejus scripta vel emendentur vel illustrentur.”¹⁷⁶ Any philological enquiry would do. However, the questions could also be more specific: one question (*Quae fuerit domestica Ciceronis vita?*) led to a curious entry which the reviewer thought quite irrelevant: “Of Cicero vroeg of laat opstond; of hij één of elf buitens had; of zij elegant of eenvoudig gemeubeld waren: heeft eigenlijk zeer weinig wetenswaardigs.”¹⁷⁷ A sketch of Cicero’s character in daily life was expected, although this was admittedly not entirely evident from the question. In line with the development of classical studies from narrow textual philology to a broader *Altertumswissenschaft*, questions were also posed about issues such as the *leges agrariae*, inspired by the work of Niebuhr, or the influence of Epicureanism on Roman morals.¹⁷⁸ At the same time, questions about the works of Polybius, Thucydides, Aristophanes and others remained very frequent in the later decades of the nineteenth century. In contrast to the HMW, where the classics were no longer discussed during the course of the nineteenth century, in the PUG many of the most prominent classicists of the Netherlands still met and held a position of influence throughout the century. In that way, they kept a humanist vision on science alive, as is evident from many of the speeches made in the assembly that at least pay lip service to the ideal of a broad education for the development of a well-rounded personality.

¹⁷⁴ The jury had some trouble in judging the translations because the society had demanded a translation which was faithful to the style of Herodotus, characterized as being of a naïve and childlike simplicity. What such a style amounted to, was a matter of taste, and not easy to judge, as prominent scholars such as Siegenbeek, Bake, Den Tex and De Vries argued. See UA, PUG, inv. nr. 244.

¹⁷⁵ In 1819, for example, two prize-winning entries in this field were written by J. Lenting and P. Hofman Peerlkamp, headmasters of the Latin schools of Zutphen and Haarlem, respectively.

¹⁷⁶ UA, PUG, inv. nr. 245. Programme 1823.

¹⁷⁷ UA, PUG, inv. Nr. 247. Letter dated April 1826.

¹⁷⁸ See for this development of philology: James Turner, *Philology*, chapters 6 and 7.

Criteria in judging essays

During the early years of the PUG, members were required to send in at least one piece of work a year. This obligation did not necessarily lead to quality work: in the first two years of the society's existence, 27 essays were submitted, none of which were deemed fit for publication.¹⁷⁹ Often the pieces had very practical concerns, such as strengthening dikes, building safe gunpowder magazines, or preparing a certain perfume. Given the nature of these topics, it makes sense that the judges of these questions emphasized the quality and amount of empirical data and experiments confirming the proposed solution or device in judging them worthy of publication. Sometimes they even tried to repeat the experiments: a proposed remedy against ants was tested by reviewer Nahuys, who concluded that it did not work at all.¹⁸⁰ In the second half of the nineteenth century, when the experiments the writers undertook became more complex, this kind of check became impossible, but the reviewers remained highly critical of the quality of the experiments and their set-up, by wondering whether all variables had been accounted for, and whether the experiment provided direct proof for the thesis. In short: what was the value of the data the author presented?

Another question that the reviewers often posed, was whether the essay under investigation would interest the general public by being useful to them. In their reports, they mention that a certain essay would be worthy “aan het publicq gecommuniceerd te worden” or “ter drukperse overgegeven”. And Laurens Praalder, in discussing an essay on the important topic of determining distance at sea, concluded that it contained “nuttige en weetenswaardige zaken die aan het publicq van veel dienst kunnen zijn, en dus wel waardig om ter drukperse gebragt te worden.”¹⁸¹ Still, reviewing these essays was not always easy: reviewers could have different standards, making it hard to reach a consensus. Secondly, for the individual reviewers, it was sometimes hard to judge if the question was answered in the way the author of the question had intended. Finally, judging often involved walking a fine line. As H.C. Cras remarked in one of his advices: “Het beoordelen van eens anders werken en geschriften heeft doorgaens twee groote ongelegenheden: Te veel inschikkelijkheid doet geweld aen de waerheid, en ontnemt aen de verdiensten der schuldigen lof. Te veel

¹⁷⁹ UA, PUG, inv. nr. 241.

¹⁸⁰ UA, PUG, inv. nr. 241. Entry marked 81, letter Nahuys 19-08-1779.

¹⁸¹ UA, PUG, inv. nr. 241. Entries marked 51 and 59. Cf. also the advice on an essay about sluices by Cornelis Redelijkheid (marked 76). The reviewer would “tot nut van ‘t gemeene best, onderrigting voor aannemers, off opzigtters van zulke werken, oordelen het ter drukperse toe te laten.” He also judged the writer (Redelijkheid) to be a man who “schijnt bij zijn Oordeel, ondervinding, en gebruik te voegen” - a man who knows what he is talking about therefore. He was right about this: Redelijkheid was experienced in hydraulic and mechanical engineering and his prominent presence in the society around this time is proof of the prominent involvement of technicians and practical men of science in the early PUG.

strengheid bluscht den moed uit, en wederhoudt loffelijke pogingen.”¹⁸² If the PUG was to publish poor quality, it would never establish a reputation, but on the other hand, if it wanted to engage the learned community of the Netherlands (in the broadest sense) in coming up with solutions and new ideas, it could not discourage valiant efforts with overly harsh reviews.¹⁸³

And it should be noted that many attempts were quite valiant indeed, since it was not at all unusual for an entry to be longer than a hundred pages. It was not even exceptional to receive pieces of three to four hundred pages. If I use the word essay or entry here, it should therefore be kept in mind that many of the entries would now be considered book-length studies, and rather long books at that. On the other hand, there were writers who hoped to win a competition with entries of only a few pages. These efforts were rarely considered sufficient, especially since the questions that were posed by the society were often extremely comprehensive and hard to answer completely.

In fact, the prize questions (especially the earlier ones) usually were actually composed of three or four questions: the directors would ask for an overview of earlier literature on the topic, an analysis of the causes of the problems and a concrete (feasible and affordable) solution: if one of these sub-questions was answered incompletely, that was usually enough reason to refuse to award a prize.¹⁸⁴ Sometimes even a single question could provide a truly daunting task: the prize contest about psychology required an overview of what different philosophical schools throughout history had thought about the ‘zielkunde’. One adviser showed off his large erudition by arguing that the author had ignored non-European traditions: “De Zen D’Avesta van Zoroaster door Anquetil du Perron uitgegeven, de Chonking der Chinezen, de Vedam der Braminen, ja de Edda der Ijslanderen, bevatten of vooronderstellen, zekere zielkundige gevoelens en ontdekkingen, welk in een generaal resultat wel degelijk in aanmerking moeten komen.”¹⁸⁵ This critic also showed early

¹⁸² UA, PUG, inv. nr. 242. Letter dated 10-04-1783.

¹⁸³ Although the reviewers did not hesitate to destroy the authors of less valiant efforts: one entry on the prize question on phlogiston was considered “voor het grootst gedeelte non sens” by Van Marum (letter of 16-01-1788) and Voltelen said: “draagdt de duidelijkste kenmerken van een ontsteld brein” (letter of 29-02-1788) (inv. nr. 242). On another occasion Van Lynden was angered by having to work his way through a bulky entry which was not more than the “quintessentie van zelfsbehegen” and “onnozel gezwets”. UA, PUG, inv. nr. 249. Letter dated 16-04-1835.

¹⁸⁴ Out of many possible examples, consider for example this question, posed around 1785: “Welke zijn de eigenlijke oorzaken, waarom de scheikunde bij onze Nabuuren, en vooral bij de Duitschers, in meer aanzien en algemener oeffening is, dan in ons vaderland? Welke is de beste wijze om, ten minsten, in de voornaamste steeden van onze unie, de scheikunde, in haare grondbeginzelen te doen onderwijzen? Welke zijn de bekwaemste middelen, om die noodzakelijke en voor de mensch heilzame kunst, bij de Artzenijmengkundigen in algemener oeffening te brengen? En eindelijk hoe zoude men de deugdzaamheid der chemische bereidingen, inzonderheid die van buiten ingevoerd worden, best kunnen onderzoeken, ten einde de vervalsching voor te komen?” These four questions would each suffice to write an entire essay on.

¹⁸⁵ UA, PUG, inv. nr. 242.

awareness of Kant's critical philosophy, but admits that the required overview is very hard to provide even for him, clearly more qualified to deliver such an essay than the writer. Something of the encyclopaedic ideal still sounds through here, but it is clear that with new developments in philosophy and the discovery of non-European traditions, it becomes ever less attainable.

The compilation-approach to science not only became less attainable, however, it also became less desirable. Time and again, the reviewers criticize entries for providing materials (*bouwstoffen*) for an entry, without bringing these materials into a coherent argument. D.J. van Lennep brought this argument forward in 1821, and it occurs often thereafter, especially with regard to the historical questions.¹⁸⁶ Many entries delivered nothing more than *rudis et indigesta moles*, as the customary Ovidian expression went. As one anonymous reviewer summarized this problem:

Aan *het eerste* gedeelte der verhandeling, ontbreekt derhalve, naar mijn gevoelen, al het vereischte van een historisch overzicht - de bijzonderheden, die hij daartoe heft bij een gezocht, mogen op zich zelve beschouwd, meerendeels waar zijn, zij zijn niet behoorlijk gerankschikt [sic]; slechts op zich zelve staande; niet tot algemeene punten gebragt, nog ook tot een juist en wel geordend geheel vereenigt, en zij kunnen alzoo niet anders worden aangemerkt, dan als eene groote reeks van bouwmaterialen, met meer vlijt opgezocht, dan met orde te zamen gevoegd, en aan welke in alle gevalle de oordeelkundige hand van eenen bekwaamen bouwmeester heeft ontbroken.¹⁸⁷

Both aesthetically and epistemologically, these entries lacked coherence and unity. They were the products of chroniclers, not historians, and modern history expected more from its practitioners than a simple collection of facts, however industriously gathered.

Finally, there are some basic criteria which are still valid today that come back time and again in these reviews. One is the requirement that the author is aware of the latest work on the topic he is writing on. This was not always easy to achieve: as we have seen, many amateurs wrote these essays, and they were not always in a position to consult the latest work from, say, Germany. Consequently, many contestants instantly disqualified themselves by basing themselves on outdated ideas and works. A second criterion – and the only one that comes back in almost every review – is that of style. Spelling mistakes, a lack of fluency, mistakes in translations, or just a general ineptness in writing: no reviewer fails to chastise the writers for not writing correct and beautiful Dutch. Clearly, the culture of rhetorical excellence, inherited from an older culture, also made its influence felt in the world of the written word. Every now and then, an entry would be turned down, despite there being no substantial objections to the contents, because its style was so very poor. The importance of

¹⁸⁶ UA, PUG, inv. nr. 245. Letter dated 30-11-1821.

¹⁸⁷ UA, PUG, inv. nr. 250. Letter dated 23-03-1836.

this culture of eloquence is underlined by the special contest organized in 1836 on the occasion of the centenary of the Utrechtse Hogeschool, asking a poem celebrating that institute: no less than nine entries were received (no other question in this period comes close to receiving this many entries), with winning poems by B.W.A.E. Sloet tot Oldhuis, W.H. Warnsinck Bzn. (both gold), and E.W. van Dam van Isselt (silver).¹⁸⁸ A final illustration of this point is the discussion in the general assembly of 1889, when the members become strongly divided on publishing an entry on Seneca which was excellent as regards content, but written in a very poor style. Some of the members thought that content should trump considerations of style, while others thought it would dishonour the PUG to publish something so ineptly written. In the end, the piece was refused with 41 against 23 votes. It is very telling that a piece which received no substantial criticism on content was still refused purely on grounds of a deficient style.¹⁸⁹

3.3 Why should science be pursued? Functions and goals of science

The first regulations of the society, published in 1776 had the following to say about the scope of the society's activities:

De verhandelingen, stukken, en berichten, die aan dit genootschap ingelevert, en toegezonden worden, zullen voornamentlijk tot doelwit hebben, het nut van het vaderland, en ook mogen behelzen wijsgerige, en economische onderwerpen: als meede alle nieuwe uitvindingen, en verbeteringen tot nut van de menschelijke maatschappij, en zoo voorts: allenelijk de godsgeleerdheid uijtgesloten¹⁹⁰

The scientific ideal discernible in this article is clearly one of science in service of the (material) wellbeing of the nation: science, therefore, with a strong utilitarian and patriotic bent. Indeed, the discussion of the topics of the prize essays in 3.2 proves that this was the case in the PUG: protecting the Dutch citizens against the dangers of water, improving agriculture and industry, these were the concerns that were quite central in the eighteenth century and would remain present in the society to some extent throughout the nineteenth century. Being useful to their fellow citizens would also be the best way to increase the

¹⁸⁸ UA, PUG, inv. nr. 69. Judges on this occasion were the eminent PUG-members Jeronimo de Vries, A.C.W. Staring (a celebrated poet himself), and the omnipresent D.J. van Lennep.

¹⁸⁹ UA, PUG, inv. nr. 74. On the revival of the rhetorical culture and the re-emergence of many chambers of rhetoric, see W. van den Berg and Piet Couttenier, *Alles is taal geworden. Geschiedenis van de Nederlandse literatuur 1800-1900* (Amsterdam: Uitgeverij Bert Bakker, 2009), 487-492.

¹⁹⁰ UA, PUG, inv. nr. 1. Regulations 1776. See for more background on the relation between religion and science in the Netherlands a useful overview by Rienk Vermij, "Science and Belief in Dutch History", in: Van Berkel, Van Helden and Palm, *A History of Science in the Netherlands*, pp. 332-347. See for longer studies: J. Bots, *Tussen Descartes en Darwin: Geloof en natuurwetenschap in de achttiende eeuw in Nederland* (Assen: Van Gorcum, 1972) and Rienk Vermij, *Secularisering en natuurwetenschap in de zeventiende en achttiende eeuw: Bernard Nieuwentijt* (Amsterdam: Rodopi, 1991).

prestige of the society: in judging the pieces in this earlier phase of the PUG's existence, reviewers often argue that a submission will or will not be to the credit of the society. The underlying assumption being that social honour and prestige are connected to social commitment and engagement, not just for the individual, but for a society as well. However, it was not only by publishing useful essays that the society wanted to ameliorate Dutch society: it also hoped to urge talented citizens to employ their own talents for the greater good. An early essay on improving care for the poor (by an author calling himself 'Armen vriend')¹⁹¹ was judged not to be perfect, but still deemed fit for publication since it might encourage others to start writing on the same topic, a hope the author had also expressed. Spurring on a public debate in itself was a useful thing to do because it would tap into the latent intellectual potential of the nation. The idea that one wrote in service of the nation was also expressed by the numerous writers who signed their entries with the motto *in magnis voluisse sat est*.

In general, it can be remarked that the PUG in its earlier years was torn between two different ideals: the one aiming at spreading existing knowledge in an accessible way to the public at large, the other at publishing new research at the edge of science, an exercise *eo ipso* less suitable to be communicated to and understood by the lay public. To give just one example from these early years: one entry provided a new way to portray the heliocentric model, which was praised by the reviewers because it would appeal to "liefhebbers der sterrekunde" who were not very well versed in trigonometry. Yet another entry is criticized by Van Geuns in february 1780 because of lack of originality: "dat ik te vergeefs gezogt heb naar iets nieuws of bijzonders, en zelfs naar iets 't geen niet den scheikundigen leerling genoeg bekend is."¹⁹² This often recurring criticism of lacking original research is made from the viewpoint of science as the business of a group of professionals who care less about an understandable and attractive presentation of well-known material than about exciting new research. The case of the medical question regarding nervous illness illustrates this: moral exhortations in the style of the spectators were clearly written for the larger public, but were of less use to medical professionals who wanted a clear analysis of the causes and cures of nervous illnesses.¹⁹³ Whereas some members of the PUG were focussed on the scientific community, others clearly participated in the activities of the society from a concern with public welfare, and these differing visions of science could lead to clashes.

¹⁹¹ UA, PUG, inv. nr. 241. Entry marked nr. 63.

¹⁹² UA, PUG, inv. nr. 241. Entries marked 86 and 88.

¹⁹³ A letter by Bicker (d.d. 12-12-1782) to the directors illustrates this point: he asked them how he should judge the entries: "Eindelijk behoor ik te weten of de vraag alleen is ingerigt ter instructie der medici, dan te gelijk om alle onze landgenooten te leeren welke de oorzaken van hunne zenuwziekten zijn en hoe zij die kunnen voorkomen." Apparently, he had not wondered about this when writing his own entry.

At the same time, however, we can see that the older humanist culture and ideals live on: in 1799 the first article of the regulations cited above was edited to include the phrase that the society would also dedicate itself to “alles, wat betrekking heeft op Literatuur, Poesie, Historien &c.”, topics on which essays were to be published in a separate journal, the *Acta Literaria*, which was a journal entirely in Latin.¹⁹⁴ As we have shown, even the questions themselves were posed in Latin in the programmes of the society, thus keeping alive the Latinate humanist culture during the entire nineteenth century, albeit for a probably increasingly small group of dedicated classicists. Indeed, one of the pieces sent in as the required yearly submission in 1779 was a rare philological exercise about the Roman poet Martial, judged sufficient, although the problem was “dat zij wat al te geleerd is, om door een enkel Neer-duitschen lezer met genoeg gelezen te worden: dat zij derhalve, voor dezen wat gekort diende te worden.”¹⁹⁵ Clearly, the public that the society aimed at was fairly large in the early decades of its existence. Around the middle of the nineteenth century, it was tacitly understood by everyone involved that research of this kind was not meant for everyone and such attempts to make it accessible and translate the research into Dutch would not be made anymore.

During the nineteenth century, the language of usefulness and patriotism becomes less outspoken, although we can still see the occasional question that is clearly written in this tradition. However, if one compares the statements of the goals of the societies in later versions of the regulations, formulated in 1833 and then repeated without change in 1857, the general tone seems to be more objective, and no mention is made of the patriotic motivation:

- 1 Het doeleinde van dit Genootschap is, om nuttige kennis te bevorderen en te verspreiden, en wel voornamelijk door het ontvangen en uitgeven van verhandelingen en berigten over belangrijke onderwerpen van Wetenschap en Kunst.
- 2 Geen belangrijk onderwerp van Wetenschap en Kunst is van de werkzaamheden van dit Genootschap uitgesloten, ten ware hetzelfde tot godgeleerde en staatkundige geschillen behoorde.¹⁹⁶

While the focus on utility for the nation is absent, judging by the questions as discussed in 3.2, in practice this ideology had not entirely disappeared. Still, this shift in formulation signifies a larger trend towards a less instrumental view of science and the appearance (or comeback) of a view in which science aims at increasing pure knowledge, where nationality is irrelevant. Many scholars emphasized the importance of Latin for the development of good

¹⁹⁴ UA, PUG, inv. nr. 1. Regulations 1799.

¹⁹⁵ UA, PUG, inv. nr. 241, entry marked 82.

¹⁹⁶ UA, PUG, inv. nr. 1. Regulations 1833 and 1857.

taste and complained about the one-sided and materialistic emphasis upon utility.¹⁹⁷ In a way, this is quite reminiscent of the early modern humanist Republic of Letters, where borders were also easily negotiated and utility was far less important than knowledge for its own sake.

Already during the eighteenth century, more specialized professional societies came into existence: professionalization was a trend that became even stronger during the nineteenth century, and this forced the PUG to reflect on its own position within a changing scientific field. The philosophy professor Van Goudoever, speaking for the yearly assembly of 1843, tried to hold on to the ideal of the unity of the sciences:

Bij ons toch neemt men geene afsluiting van kunsten, wetenschappen en letteren waar. Veel min ziet men eene beperking van afzonderlijke vakken van menschelijke kennis in ons midden plaats hebben. Neen: zoo ergens dan hier schijnt men van de waarheid doordrongen, dat alle kunsten en wetenschappen door eenen gemeenschappelijken band vereenigd zijn en het hooge doel daarin gerigt is, om door vereenigde pogingen, niet deze of gene wetenschap, maar alle vereenigd in ons vaderland te doen bloeijen en den wetenschappelijken roem van *Nederland* te handhaven en uit te breiden.¹⁹⁸

The fact that Goudoever felt it was necessary to remind the society of this higher goal of science is telling in itself. Apparently, members increasingly became preoccupied with their own discipline, without reflecting on the larger ramifications of their work or social position. Indeed, it was this very specialization which made the PUG more relevant than ever, for here members could keep themselves abreast of the latest developments outside their field. According to Lintelo de Geer in 1856, it was

juist de behoefte aan samenwerking en voorlichting en mededeeling bij den man van wetenschap en kunst doen ontstaan. *Of zou er geen waarheid meer zijn in de overtuiging der oudheid, dat alle wetenschappen en kunsten met elkander verwant en als met eenen band naauw zamengestregeld zijn?* [...] En het doel, de wetenschap en kunst vruchtbaar te maken voor het leven, het zal niet kunnen worden bereikt, dan door samenwerking en mededeeling, door toetsing en vergelijking van het gevondene. Zij zal vruchtbaar zijn voor iederen beoefenaar, voor de maatschappij, voor de wetenschap en kunst zelve.¹⁹⁹

Finally, from the middle of the nineteenth century, we can discern awareness in the society that the institutional shape and demands of science had changed. This is visible in the changing perception of the role of scientific societies: as the eminent theologian H.J. Roijaards reflected in 1847, the earlier goal of the society was “jeugdige vernuften en geleerden ontwikkelen, op belangrijke wetenschappelijke punten de aandacht rigten, dwalingen des tijds bestrijden, en den bloei van kunst, wetenschap en leven aankweeken.” But this patriarchal role was no longer needed, these goals were reached: “De Genootschappen beschouwen zichzelf niet langer als de Aristarchen en Keurmeesters; maar een ander beginsel

¹⁹⁷ See for example the complaints of J.M. Kemper in 1812, cited in Johanna W.A. Naber, *Joan Melchior Kemper 1776-1824* (Haarlem: H.D. Tjeenk Willink, 1913), 72-75.

¹⁹⁸ UA, PUG, inv. nr. 70.

¹⁹⁹ UA, PUG, inv. nr. 71. My italics.

heeft zich op het terrein der wetenschappen krachtig geopenbaard. Men wenscht gezamenlijk, en zelf met onderlinge kracht aan de wetenschappen te arbeiden.”²⁰⁰ Encouraging cooperation in larger projects was now a more apt way to promote science, of which the growth in popularity was seen by the societies as to a large extent their own success. Clearly, around 1850 the PUG still saw a major role for itself in as an institution that facilitated the growth and progress of science.

This was also reflected in a changing view on the prize contests. Initially, the motivation behind the prize contests was to aid scholars financially in the publication of the, often rather voluminous, products of their research. However, during the second half of the nineteenth century scientists in a position to contribute to the increasingly complex work at the vanguard of science often had a position at a university and access to the many (specialized) scientific journals that sprung up, making it less and less urgent to spend money and time on the prize contest. In 1902 the directors reflected on the decision to abolish the prize contests in 1898:

Dit is geschied in de overtuiging dat de prijsvragen niet meer van onzen tijd zijn. Vroeger, toen het publiceeren van wetenschappelijken arbeid moeielijk en kostbaar was, bewezen de Genootschappen door prijsvragen uit te schrijven een werkelijken dienst aan de wetenschap. Maar in den tegenwoordigen tijd, nu op ieder gebied tijdschriften en archieven bestaan, die gaarne de resultaten van onderzoekingen mededeelen, nu is de behoefte aan een afzonderlijk uitgeven daarvan zeer gering. Maar een andere behoefte is langzamerhand ontstaan die zich in de geheele wetenschappelijke wereld doet gevoelen. Naarmate nl. de wetenschap zich ontwikkelde werd het wetenschappelijk onderzoek moeielijker en ingewikkelder. Kostbare hulpmiddelen van allerlei aard zijn dikwijls noodig. Zonder steun kan men dikwijls een dergelijk onderzoek niet eens aanvangen.²⁰¹

During the later decades of the nineteenth century, the PUG increasingly spent its money on subsidizing costly scientific expeditions, rather than focussing on financially assisting with publishing the results.²⁰² In 1883, for example, the PUG contributed 500fl. to the foundation of a zoological station at Batavia for research of the local marine fauna. In 1884 the same sum was awarded to the orientalist C. Snouck Hurgronje to travel to Djeddah and study Islam. And in 1887 500 fl. was given to the anthropological ‘Vereeniging voor Oudheid-, Land-, Taal-, en

²⁰⁰ UA, PUG, inv. nr. 70.

²⁰¹ UA, PUG, inv. nr. 75.

²⁰² The practice of supporting large scale expeditions was not uncommon before 1800. See McClellan, “Scientific Institutions”, 93: the attempts to observe the transit of Venus from different places in the world in 1761 and 1769 is of course well known. Experiments to collect large sets of meteorological data - something Buys Ballot would strive for in the middle of the nineteenth century - were already undertaken by the Meteorological Society of Mannheim in the 1780s and 1790s.

Volkenkunde' in Djokjakarta who needed the money to unearth and photograph a series of bas-reliefs at the Buddhist sanctuary Borobudur.²⁰³

Another key goal expressed by the regulations and the speeches at the yearly assemblies was that of contact and cooperation between scientists, something that was added to the regulations in 1863.²⁰⁴ If science became increasingly compartmentalized into disciplines, did this mean that there was no use in meeting those of other specializations? Many argued that this was not the case. The famous ophthalmologist F.C. Donders told the general assembly in 1852 that the formation of different schools – even within single disciplines – was on the rise, a development which he eloquently deplored:

Zoo vergeet men, dat, door vreemde elementen uit te sluiten, men den grond legt tot eene eenzijdigheid, die zich zelve bestraft. In de verstandelijke wereld immers is het, in dit opzigt, niet anders als in de stoffelijke. Even als geheele rassen van dieren ten slotte wegwijnen en uitsterven, wanneer zij zich enkel onder elkander vermengen, even als aanzienlijke familiën, wier ligchamelijke en zedelijke kracht de geschiedenis heeft opgeteekend, door uitsluiting van vreemde elementen en huwelijken in bloedverwantschap, dieper en dieper gezonken zijn, om ons op den laatsten afstammeling medelijgend te doen nederzien, zoo is de eenzijdigheid die uit gemis aan verstandelijke wrijving voortspuit, doodend voor den geest.²⁰⁵

The same idea was expressed by P. Harting – a vocal supporter of having a wide range of interests – in 1864: wondering whether all members were equally attentive when the directors read the jury reports on prize questions outside one's own field of study, Harting emphasized the unity of science once more: "Maar toch mogen wij nimmer vergeten dat de wetenschap zelve een enkel groot gebouw is, aan welks voltooiing wij allen gezamenlijk arbeiden, elk naar de mate zijner krachten."²⁰⁶ Clearly, not all members of the society were as interested in keeping alive the classical heritage, something that J.J. van Oosterzee deplored in the remarkably pessimistic address he delivered at the centenary of the PUG in 1873. His main fear was that "hand over hand krijgt het Utiliteitsbeginsel den boventoon op ieder gebied, en de dagen zijn niet verre meer, dat men, als Campe in de vorige eeuw, den uitvinder van het

²⁰³ UA, PUG, inv. nr. 73. Incidentally, the subsidies of 1883 and 1887 were for projects which had also applied to the KNAW for funding, but that society - despite its close links to the central government - could not afford to help out. According to the yearly financial reports that can also be found in the reports of the yearly meetings, the PUG in this period had an annual surplus of around 2000fl.

²⁰⁴ See for a discussion about the importance of sociability in the establishment of societies Vermij, "Nieuwe wijn in oude zakken?", *Tijdschrift voor Geschiedenis* 112(1) (1999), 24-46; Ibidem, "Genootschappen en de Verlichting: enkele overwegingen", *De achttiende eeuw* 25 (1993), 3-23 and Wijnand Mijnhardt, "Genootschappen en de Verlichting: een repliek", *De achttiende eeuw* 26 (1994), 101-114.

²⁰⁵ UA, PUG, inv. nr. 70.

²⁰⁶ UA, PUG, inv. nr. 71. Harting went on to talk about the origins of different peoples, which he saw as an interdisciplinary field of study where the different sciences could meet and work together, which would strengthen their mutual appreciation. The same idea about science as a large building on which everyone worked together was expressed by A.H.G.P. van den Es in 1878. See for Harting's view of science Theunissen, '*Nut en nog eens nut*', 57ff.

spinnewiel grooter zegen der menschheid zal achten, dan den ouden vader Homerus.”²⁰⁷ This conclusion does seem at odds with the development of the prize contests however, where the utilitary principle was strong during the eighteenth century, but lost its force during the nineteenth century.

3.4 Who were active in the society? Development of membership

Due to constraints of time and space, a full-blown prosopographical analysis of the members of the PUG will not be provided here.²⁰⁸ What I am especially interested in here, is the more committed part of the society: those active in submitting prize essays and judging them. It should be noted that interest in the society did not necessarily diminish towards the end of the nineteenth century. Although many historians see the decades around 1800 as the heyday of Dutch sociability, the PUG still drew a sizeable crowd at its yearly assemblies. In 1894, for example, about 120 members of the society were present at its assembly, representing about 20% of its total number of regular members (roughly 500 people towards the end of the nineteenth century).²⁰⁹ This number was fairly stable throughout the nineteenth century. If anything, the society still fulfilled a social role around 1900.

Professionalization of scholars is a well-known aspect of the development of science in the nineteenth century, which is clearly visible in the PUG and other societies. Broadly speaking, in the earlier decades of its existence, the advisers of the prize contests were in many cases working as lawyers, ministers, or in another capacity outside the world of higher education. In the later decades of the period under investigation, this changed decisively. This was accompanied by an increasing awareness of the exclusivity of knowledge and science. Ever fewer people were in a position to take part in scholarly discussions. As J. Hora Siccama told his audience at the PUG’s yearly assembly in 1849: “In deze eeuw, waarin alle nasporing

²⁰⁷ UA, PUG, inv. nr. 72. The entire speech is suffused by a deeply pessimistic worldview that believed much progress to be an illusion. Although Van Oosterveen admitted that the natural sciences had expanded enormously, the humanities had really not progressed substantially. Van den Es would disagree in 1878: the growth of philology from textual criticism to a much broader *Altertumswissenschaft* was a form of progress.

²⁰⁸ A large number of member lists can be found in the PUG archive, inv. nr. 4. It is also possible to reconstruct the lists of new members year by year by going through the reports on the general assemblies, which mention the new members for each year, as well as the members who had died in the year leading up to the assembly: see inv. nrs. 67-76. See for a list of directors up to 1918: Singels, *Gedenkboek PUG*, 240ff. For a list of early members, see Bouwman, *Tot nut van het vaderland*, 121ff.

²⁰⁹ UA, PUG, inv. nr. 74.

en beschouwing de gestalte verkrijgt van wetenschap, wordt ook alle kennis van hen verwacht, welke, boven anderen, het weten, om het weten zelf, beoefenen.”²¹⁰

In the earlier decades of the PUG, we see broadly oriented scholars – who commented on an incredible range of topics – such as D.J. van Lennep, whose functions on becoming member of the PUG in 1808 were listed as “Prof. Eloq. Poës. Hist. Antiq. Litt. Graec. & Latin. Aan het Athenaeum il. te Amsterdam.” Rhetoric, poetry, history, antiquities, Greek and Latin: here was a member apparently proficient in all the major humanistic disciplines and more.²¹¹ On the other end of the spectrum, there were members of whom one would not immediately expect learned essays. A question about the nature of enthusiasm in the 1820s was won by a certain J.A. Bakker, a painter from Rotterdam. Jury member Van Ewijck was stunned when he learned the profession of the writer: “Nimmer zoude ook ik gedacht hebben, dat de verhandeling over het enhusiasmus eene kunstschilder tot auteur had. De stijl droeg alle kenmerken van te zijn van iemand geoeffend in het stellen, en dit treft zeldzaam bij kunstschilders.”²¹² Participating in prize contests was not necessarily limited to professional scientists at this point in time, but it was expected that the writers were at least well trained in the written word: entries from ministers or lawyers were therefore not surprising, but Van Ewijck and others did not expect entries from those working primarily with their hands.

Among the participants in the society there was also a significant share of high officials. The question about cancer was proposed by the former minister of the interior, W.F. Roëll. And a winning entry in 1836 on the sixteenth-century humanist Lambertus Hortensius, including an annotated translation of his principal work, was written by Gregorius Mees, then a deputy judge in Rotterdam. Increasingly in the nineteenth century, the study of nature became too complex and required too many tools to be accessible to amateurs. However, wealthy enthusiasts with time on their hands could still participate in literary and historical pursuits. Koenen, who wrote a large piece on the history of the Jews in the Netherlands, had given up his practice as a lawyer to spend his life as a private citizen pursuing his studies, although he was also politically active within the Réveil. Jacob Dirks, who wrote on the gypsies in the Netherlands, had a similar background in law and politics, although he also spent eighteen years in Parliament and was a key figure of the Friesch Genootschap. He still found enough time to spend significant efforts on historical research in a non-professional

²¹⁰ UA, PUG, inv. nr. 70.

²¹¹ Within the ‘humanities’, a broad orientation was considered necessary in the eighteenth century. See Inger Leeman and Gert-Jan Johannes, *Worm en donder: geschiedenis van de Nederlandse literatuur 1700-1800: De Republiek* (Amsterdam: Uitgeverij Bert Bakker, 2013), 247.

²¹² UA, PUG, inv. nr. 244. Letter dated 21-07-1821.

capacity. However, many of those seemingly engaged in a day-time job and the writing of voluminous prize essays at the same time, were apparently financially in a position to spend most of their time as independent researchers. Another example of this is Otto van Rees, who won the medal for his essay on Van Hogendorp, and was registered as a lawyer, but spent his life writing on the economic and political history of the Netherlands. Others, however, really combined their jobs with substantial scholarly work, such as the gymnasium teacher W. Bisschop, who successfully entered a piece on Justus van Effen in the 1850s, but also published a number of other historical works.

Membership of scientific societies was considered normal, and were pursued quite eagerly by some, so the membership lists do not necessarily tell us a lot about the prestige and importance of the society. It should nevertheless be noted that the PUG did manage to attract many prominent scholars to do their reviewing work. The scientific questions in the later nineteenth century were often reviewed by eminent scholars such as Lorentz, Van der Waals and Beijerinck, legal questions by figures such as Fockema Andreae and De Pinto, and the frequent classical questions by prominent classicists such as Bake, Van Lennep and Geel. Also important, though, was the presence of major Dutch scientists such as Harting, Donders and Mulder, who had outspoken ideas about science, and could steer the PUG in the direction of experimental science. However, Harting was a proponent of a broad education, and Mulder lobbied for the return of a literary section in the KNAW. In addition, the PUG had many members from the classical studies, and as a consequence, the PUG would never transition to a purely natural scientific society, which HMW did to a much larger extent.²¹³

²¹³ See for discussions of their opinions Theunissen, *'Nut en nog eens nut'*, as well as Theunissen, "'Een warm hart en een koel hoofd'. Pieter Harting over wetenschap, de natie en vooruitgang". *Bijdragen en mededelingen betreffende de geschiedenis der Nederlanden* 110(4) (1995), pp. 472-498; Ibidem, "Pieter Harting: wetenschap voor de natie", in: L.J. Dorsman (ed.), *Beroep op de wetenschap: Utrechtse geleerden tussen universiteit en samenleving 1850-1940* (Utrecht: Universiteit Utrecht/Uitgeverij Matrijs, 1999), 53-62; Ibidem, "F.C. Donders en de wetenschappelijke bril", in: L.J. Dorsman (ed.), *Beroep op de wetenschap: Utrechtse geleerden tussen universiteit en samenleving 1850-1940* (Utrecht: Universiteit Utrecht/Uitgeverij Matrijs, 1999), 65-75.

3.5 Conclusion

If we compare the PUG to other Dutch societies in the eighteenth century, it is clear that the PUG was a fairly typical society in its utilitarian approach to science. However, many societies narrowed their focus, or were limited in scope to begin with, during the nineteenth century. Here the PUG stands out for remaining interested in an extremely diverse range of topics. In a random but quite representative year – 1820 – questions were asked about ophthalmia, a better use of the dune areas, crossbreeding of different breeds of sheep, the fertility of different types of clay soils, a history of Utrecht schools in the tenth and eleventh centuries, a history of the Roman colonies, teaching geometric drawing, the influence of the atmosphere on magnetism, means to counteract the resistance against cow pox vaccination, as well as four philological questions. In contrast to other societies, therefore, within the PUG no single scientific vision won out. The utilitarian approach would become less prominent, but did not disappear altogether, whereas the more ‘purely’ scientific approach was never embraced fully. This was partly because many of the scientists believed in the importance of the humanities, and partly because of the fact that the PUG had a diverse membership where no figure or group could dominate the proceedings to the exclusion of others. Before drawing some more general conclusions, however, we should take a closer look at another Dutch society in the next chapter.

Chapter Four - Hollandsche Maatschappij der Wetenschappen

4.1 Introduction and background

History

Unlike so many other European societies, the HMW was not founded at the instigation of a prince, or because of pressure of scientists themselves (as in the case of Leibniz and the Berlin Academy), but by a group of regents. What drove them might have been the fact that by 1752 numerous European scientific societies existed and the regents felt they could not stay behind. It might also have to do with the belief that giving an impulse to science would stop and reverse the perceived economic and moral decline of the Republic. After its establishment, the HMW sought an official protectorate by the prince of Orange, something the Leiden University resented, for they regarded themselves to be the only *societas literaria*, whose prestige would be harmed by a second society.²¹⁴ This argument did not carry the day however, and more societies would follow in Holland, notably the *Bataafsch Genootschap der Proefondervindelijke Wijsbegeerte*. The HMW in its turn resented Louis Napoleon's founding of the Royal Institute in 1808 (see 2.4), which it rightfully saw as a major competitor for the foremost national scientific society. As we will see in 4.4, the secretaries of the HMW were usually key figures who left their mark on the course of the HMW. The first secretary was the Lutheran minister C.C.H. van der Aa (from 1752-1793), followed by the versatile scientist Martinus van Marum (secretary from 1794-1837), the geologist and zoologist J.G.S. van Breda (1838-1864), the chemist E.H. von Baumhauer (1864-1885), the physicist J. Bosscha (1885-1909) and the botanist J.P. Lotsy (1909-1917).

Institutional shape

Like the PUG, the HMW was organized with a twofold structure of directors who financed the society, and scientists who did not have to pay but were expected to contribute intellectually to the work of the society. The directors were generally less aware of the latest developments within the scientific community and deferred to the secretaries of the society, which explains why the HMW had a more linear development than the PUG where there were more conflicts between scholars with different opinions about the future of science. Initially, the HMW had monthly meetings, but during the nineteenth century the frequency of these decreased, until they were only left with the yearly assembly. Since the HMW had members from all over the Netherlands, and transportation was slow and cumbersome, the meetings

²¹⁴ Bierens de Haan, *De Hollandsche Maatschappij*, 32.

were mostly poorly attended and the members present were predominantly living close to Haarlem. The HMW published the prize essays in a series of transactions, of which the most long-lived were the *Natuurkundige Verhandelingen*. There were also less successful series of *Wijsgeerige Verhandelingen* (1811-1822) and *Letter- en Oudheidkundige Verhandelingen* (1815-1820). These transactions were initially aimed at a broad public, as is evident from the fact that Latin or French submissions were translated into Dutch. It is clear evidence of the changing role the society saw for itself that, when it started a second series of the *Natuurkundige Verhandelingen* in 1839, it chose to leave all pieces untranslated and aimed at a more exclusive circle of readership. Later on, the HMW attempted to reach an international audience as well with the *Archives Néerlandaises*, first appearing in 1865, a magazine that hoped to familiarize the international scientific community with the latest results of Dutch science. Attempts to revive the other two series of transactions in 1851 were very short-lived.²¹⁵

The prize contests

As we will see, during the early decades of the HMW, under secretary Van der Aa, a very broad profile was maintained. Van der Aa was more of a compromiser in this regard than the strong-willed Van Marum after him. Van Marum was especially interested in useful applications of the natural sciences, but his successors presided over a move towards pure science, with less interest in practical applicability. An extremely useful inventory of all the prize questions has been made by J.G. de Bruijn.²¹⁶ Based on his information, a few important trends in the number and development of the prize contests can be traced under the different secretaries: under Van der Aa an average of 1.8 questions were posed each year, a number that increased spectacularly (as it did in the PUG) during the eighteenth century: Van Marum's time saw 8.1 questions each year on average, while Van Breda's secretariat (in the years around 1850) reached 15.3 each year, after which a decline set in with 8.9 for Van Baumhauer, 7.5 for Bosscha, and only 1.3 between 1909 and 1917 under Lotsy. This trend represents something of a bell curve, but the amount of awarded medals shows a different trend: from the relatively generous jury members in the eighteenth century, with 56% of the entries being awarded some prize, the number dropped to 23% under Van Marum, and continued its free fall under the next three secretaries, with the percentage stabilizing around

²¹⁵ Bierens de Haan, *De Hollandsche Maatschappij*, 192-194.

²¹⁶ J.G. de Bruijn, *Inventaris van de prijsvragen uitgeschreven door de Hollandsche Maatschappij der Wetenschappen, 1753-1917* (Groningen: H.D. Tjeenk Willink B.V., 1977).

3-7%.²¹⁷ After 1850, the questions went increasingly unanswered: in this period, half of the total amount of questions was posed (nrs. 621-1206) and only 60 to 70 of these received an entry, so 90% received no response. Before 1850 unanswered questions had slowly increased in the 1830s and 1840s, while during the eighteenth century, only about 10% of the questions went unanswered.

With regard to designing the questions themselves, the secretaries also played a major part. De Bruijn has documented the writers of the questions where possible: Van Marum himself came up with 140 of the 350 questions under his secretariat. But members C.G.C. Reinwardt (89) and S.J. Brugmans (32) were also quite active. Van Breda was even more prolific as a secretary, coming up with no less than 200 out of 412 questions during his time, and some of the more active members did not come close to this: Van der Hoeven (25), Kaiser (21), Schroeder van der Kolk (14) and Miquel (16). The next secretary, Von Baumhauer, with 66 out of 178 (37%) was somewhat less prominent, with member Van Willigen coming in second place with 27. Bosscha, however, was the first secretary who wrote less questions than some of the members: with 13 out of 180 (7%), he was surpassed by Hugo de Vries (29), Hoffmann (27), Lorentz (25) and Beijerinck (22).²¹⁸

One unique feature of the HMW was that it usually did not burn the name tickets of the entries which were not deemed fit for publication. This provides us with a rich source for prosopographical analysis, although unfortunately the practice of preserving the *biljetten* for non-winning entries was abolished in 1839.²¹⁹ In the archives of the HMW many of those name tickets as well as the entries themselves have been preserved. Due to time constraints, I have not analysed the unpublished entries, but this would be one avenue for further research that could be explored. As in the PUG, the entries varied hugely in length, from entries of just one or a few pages, to the quite normal amount of a few hundred pages, with the record being set by H.L. Gerth van Wijk's 3000 page dictionary of plant names from 1906.²²⁰

²¹⁷ Numbers from De Bruijn, *Inventaris van de prijsvragen*, 3. Under Lotsy, 3 out of 12 questions received a winning entry, but this number is so small that it is impossible to say if this is a significant development or not.

²¹⁸ De Bruijn, *Inventaris van de prijsvragen*, 23. See for more detail on these key figures 4.4

²¹⁹ Bierens de Haan has given all the prize questions a number, in chronological orders. This order has also been used by De Bruijn and will be referred to here occasionally as well. The years given here are the years in which the questions were published. They were usually answered within one or two years. If not, this will be indicated.

²²⁰ The work of a lifetime, the product of a high-school teacher from Middelburg, this dictionary was published separately from the *Verhandelingen* and is still of value to botanists. See Frans A. Stafleu, "Gerth van Wijk and his Dictionary", *Taxon* 20(5/6) (1971), 799-812.

4.2 What is science? Topics and criteria of ‘good’ science

Technical and practical questions

During the first years of its existence, the prize contests of the HMW were almost exclusively concerned with practical issues of national importance, first and foremost related to water management. The very first prize contest dealt with the silting-up of Dutch rivers, especially the Lek river (1753),²²¹ followed by questions about strengthening the beach at Petten (1754), ways to make the ecological area of the dunes more profitable to the economy (1755), and repeated questions about strengthening the dikes along the major rivers (1757-59). The focus of these questions was the particular Dutch situation: the aim was not to find general knowledge of physical processes like sedimentation, but to find feasible and affordable solutions to problems faced by the Dutch government. The first question, about the silting up of rivers, explicitly asked for an answer relating to the situation of the river Lek. And the question about the situation of the beaches required an answer geared to the state of the beach at Petten.²²² The question of 1764 about the collapsing shores of the Haarlemmermeer, is another example.²²³ Consequently, it was hard for non-Dutch writers to participate in these contests since they lacked the necessary knowledge of the local terrain. A question about dredging major waterways was answered, among others, by three writers living in Paris. Reviewer Brunings thought them insufficient because none of these writers had “locale kennis [...] van onze rivieren”.²²⁴ Foreign entries on these very local issues were surprisingly common though.

Other questions asked for more theoretical and scientific treatments of questions that ultimately, however, served industry, such as two questions proposed by Brugmans in 1811 about the production of sugar and indigo. A question concerning which methods of cooking lead to the healthiest results also had to be answered by referring to a chemical analysis of the foods and cooking processes involved.²²⁵ There were even questions about the proper

²²¹ To give an example of the typical formula of these questions, this one went: “In welke hoeveelheid zijn de Nederlandsche Rivieren sedert den aanvang deezer eeuw verzand? welk is het middel om de zanden en slikken, die zig op derzelver bodem gezet hebben, van daar te verdrijven; en derzelver meerder verzanding voor te komen?” It was also specified that this should be argued especially for the Lek river: the society expected “dus niet alleen *Theoretise* Raisonnementen, maar de zulke, die op de *Practycq* gegrond zijn.” (NHA, HMW, inv. nr. 28, italics in original).

²²² NHA, HMW, inv. nr. 370.

²²³ The Haarlemmermeer was discussed again in 1819 in a two-page question with no less than nine subquestions! De Bruijn rightly remarks that the only ones capable of answering such a question were the members of the jury themselves. See De Bruijn, *Inventaris van de prijsvragen*, 154-156.

²²⁴ NHA, HMW, inv. nr. 381. Letter dated 21-04-1773.

²²⁵ NHA, HMW, inv. nr. 419, nr. 223.

construction of chimneys (1798 and 1822) and lightning rods (1816). Sometimes, also, questions about seemingly non-technical issues, turned out to be technical after all. A question in 1817 asked for ways to remedy the deficiencies of prisons. When one writer went into the moral wellbeing of the inmates, it turned out he had not understood the question: according to P.J. van Maanen what was asked was “eene *natuurkundige* beschouwing der zelve, en wat aldaar, dat is, in die thans aanwezige gevangenissen, ter verbetering van het lot der gevangenen, met opzicht tot hunne gezondheid konde worden aangewend.”²²⁶ Rather than being concerned with rehabilitation, it was a physical-medical question.

Technical questions during the nineteenth century were sometimes also reactions to the industrialisation and the new technical procedures used in other European countries. A set of questions by Van Marum in 1823 asked for the applicability of the air pump and steam power in Dutch industry. Only a few insufficient entries were received, proof of the slow and late industrialization of the Netherlands. Also related to this is the 1832 question about the possibility and desirability of constructing a rail network in the Netherlands. According to G. Moll, this question included every aspect that one could think of regarding railways, and required more expertise than one man could possibly possess. One would need:

- 1° Eene groote kennis der staatshuishoudkunde in ‘t algemeen, en der plaatselijke en bijzondere belangen van onderscheidene deelen dezes landes.
- 2° Van den handel, scheepvaart en hunne belangen en eisschen in den tegenwoordigen toestand van Europa.
- 3° Van de Topographie van dit land, van de wegen, kanalen, rivieren, gronden en plaatselijke gesteldheid.
- 4° Een volkomene kennis der constructie, machinerie, der spoorwegen, en der rijdtuigen die er op gebruikt worden.²²⁷

In his reviews, Moll always made explicit what the question demanded according to him, and he realized how outrageous those demands often were.

During the later decades of the nineteenth century, pure science would become much more important in the society (see the next section) but practical questions did not disappear entirely. In 1844, 1845 and 1848 questions were asked about problems encountered while digging a specific kind of well.²²⁸ After 1850, occasionally a practical application would be required in a scientific question as an afterthought of sorts, but the utilitarian aspect largely disappeared.

²²⁶ NHA, HMW, inv. nr. 417. Letter dated 11-02-1819.

²²⁷ NHA, HMW, inv. nr. 433. Letter dated February 1837.

²²⁸ Nrs. 515, 538 and 593.

Natural sciences

Questions related to the less applied side of science became dominant in the late nineteenth century, but were already posed on occasion in the earlier years of the society's existence. A 1776 question, for example, asked for an essay on the moons of Jupiter and their gravitational force. And a 1780 question was a strictly chemical analysis of certain liquids: this type of question was therefore not entirely new in the later nineteenth century, but become more and more the dominant category. Still, what was called *bespiegelende wijsbegeerte*, or a theoretical approach to the natural sciences, was often not appreciated during the eighteenth century. An entry on the 1781 question concerning the age-old idea of the chain of being was reviewed by Van Marum as displaying sound metaphysical thinking, but he had expected a more down-to-earth treatment of the question derived from natural history.

Nevertheless, as mentioned before, many questions that initially seem to fall under 'pure science' had a utilitarian twist during the early decades of the HMW. In 1786 a question was posed about the way plants acquired their nutrition – a seemingly disinterested biological question. The third sub-question, however, asked for ways in which this knowledge could be used to the advantage of agriculture. And a question about the chemical system of Lavoisier was specifically interested in the uses this new system could have in medicine.²²⁹ Or, finally, the natural history of whales required in question 82 (1796) was not so much a zoological investigation, as an economically motivated enquiry into the best ways to find and kill them. This economic motive is largely absent later on in the nineteenth century, although it reoccurs on occasion. According to C.K. Hoffmann, a question about plankton was also important out of an economic viewpoint, because it was the basis of the marine food chain.²³⁰

Throughout the period under consideration we sometimes see questions that are not aimed at solving a specific problem, but ask for a sort of state-of-the-field essay, in which the history of a certain discipline is sketched, and the gaps in it are indicated. The 1767 question is an example: "Wat is 'er tot nu toe over de Natuurlijke Historie van ons Vaderland geschreeven? wat ontbreekt 'er nog aan? en welke is de beste wijze, waarop de gemelde Geschiedenis zoude dienen geschreeven te worden?"²³¹ On the face of it, this seems a purely

²²⁹ This was nr. 65, a question that was so complex that it was eventually split into the questions 87-89. No one had come close to fully answering question 65 and this was clearly an attempt to stimulate more answers. Dutch scientists had been early adopters of the system of Lavoisier – something reflected in the PUG prize contest of 1870 about the merits of Dutch chemists in the late eighteenth century: "“Een onderzoek naar de verdiensten der Hollandsche scheikundigen van het laatst der vorige eeuw, en aanwijzingen van den invloed, dien zij hebben uitgeoefend ter bevestiging en uitbreiding der theorie van Lavoisier”". See UA, PUG, inv. nr. 255.

²³⁰ NHA, HMW, inv. nr. 455. Letter dated February 1902.

²³¹ NHA, HMW, inv. nr. 377. A similar question was asked about astronomy in 1800 (nr. 90). The question about natural history was repeated in 1846, asking for an overview of the most recent 50 years.

scientific question, but a similar query in 1780 also asked about unexplored areas of natural history with the explicit requirement that the essay should be about those parts of the discipline “waar van men met gegronde reden te verwachten hebbe, dat eene verdere naspooring ten nutte van het Vaderland verstreken zal”.²³² Very few disciplines were studied for their intrinsic interest, although some advisers, such as C.A. van Brakel criticized this question because it amounted to poaching on the territory of the Oeconomische Tak, a society whose goal it was to be useful for the country, something Van Brakel at least thought should not be the task of the HMW.²³³

Under the secretariat of Van Marum, an increase in questions about electricity is evident, unsurprisingly, since it had been a major preoccupation for Van Marum already during his time working for Teyler’s Genootschap. The secretaries wrote many of the questions themselves, and could therefore steer the society in their preferred direction to some extent. Under the secretariat of Van Breda, questions about geology and fossils become more frequent, geology and zoology being his chairs as a professor at Leiden.

In zoology, one major project of the HMW was a *Fauna Belgica* (1803-26), an attempt to create a complete list of indigenous animals along the lines of the Linnaean classification. Although not complete, this was a first attempt at such an exhaustive inventory.²³⁴ The topic of the developmental history of certain classes of animals was discussed multiple times in the latter half of the nineteenth century. Strikingly, this was a question which also, almost to the letter, was issued by the PUG.²³⁵ Chemical and botanical questions also remained usual, but the practical application that was so frequently asked for in earlier questions was often dropped now. Starting in the late 1830s, there also was a series of astronomical questions by F. Kaiser, the Leiden professor of astronomy, whose questions were usually to the point and purely scientific. In this period, the questions were often motivated by discoveries by well-known European scientists. Variations upon this standard formula were common: “According to scientist x, the right theory of phenomena y is z”, after which the question would ask for further proof of the theory, or an application of the new theory to adjacent areas of science. Rather than applying existing knowledge to practical problems, the challenge became to

²³² Cited in De Bruijn, *Inventaris van de prijsvragen*, 56.

²³³ See his letter in NHA, HMW, inv. nr. 389, question nr. 40.

²³⁴ Questions nrs. 101, 254, and 284. See De Bruijn, *Inventaris van de prijsvragen*, 187-188.

²³⁵ See UA, PUG, inv. nr. 70: “Een onderzoek der ontwikkelingsgeschiedenis van eene of meer soorten uit de groepen der *Mollusken*, der *Annéliden* of der *Crustaceën*, waarvan de ontwikkelingsgeschiedenis nog onbekend is, vergezeld van de ter verduidelijking van den tekst gevorderde afbeeldingen”. One of the many HMW questions of this type was: “De Maatschappij vraagt eene ontwikkelings-geschiedenis der *Entozoa*, volgens eigene waarnemingen”. (nr. 612, 1849)

further theoretical knowledge itself.²³⁶ And instead of the impossibly large questions of the earlier HMW, questions could now be incredibly specific and detailed, e.g. “De Maatschappij verlangt een nauwkeurige bepaling, in eenheden van Weber, van den weerstand van een zuil kwik van een meter lengte en een vierkanten millimeter doorsnede bij 0° C.”²³⁷ This question also illustrates the fact that the many physical questions posed during the later decades of the nineteenth century, required a well-equipped lab, which meant that only a select group of university professors or lab assistants could participate in these questions. Van Berkel has argued that in the KNAW, a very practical orientation re-emerged around 1850 and that the idea that pure science became more popular is based on a misreading of rhetorical texts.²³⁸ However true this might be for the KNAW – an institute that had close links to the government as an *de facto* advisory board, after all – it seems less accurate for the HMW, where a practical concern is rarely displayed after 1850 and the prominent scientists present in the society focussed on the latest developments in international science rather than the pressing needs of Dutch society.

Medical questions

As we saw in the chapter on the PUG, medical questions also were often posed from a concern with a disease ravaging the country at that particular moment in time. This was not much different in the HMW, where a 1756 question was posed on *Colica pictorum* (lead poisoning) because occurrences of it were thought to have significantly increased,²³⁹ as well as questions in 1758 on the plague, and in 1759 on an alarming increase in dead cattle.²⁴⁰ The last question, more veterinary science than medicine, received answers from writers outside the medical profession, but most medical questions were answered exclusively by medical men, as was the 1760 question related to midwifery, which received numerous entries, one of them nearly 200 pages long.²⁴¹ As we will see in the next section, moral and pedagogical questions were the most popular in terms of received entries, but medical questions could be quite well-answered as well. A question about blockages of the oesophagus (1766-68)

²³⁶ A typical question in this regard (nr. 493 in 1842): “Is de meening van Dalton gegrond, dat de hoeveelheid warmte, die vrij wordt gedurende de snelle oxydatie der stoffen, in eene regt rede staat tot de door die stoffen opgenomene zuurstof; of zijn de gronden daartegen door Despretz aangevoerd, voldoende, om de onjuistheid van dit gevoelen aan te toonen? De Maatschappij verlangt, dat dit belangrijk onderwerp op nieuw proefondervindelijk aangetoond en behandeld worde.”

²³⁷ Question 947 (1874).

²³⁸ Van Berkel, *De stem van de wetenschap*, 328-333.

²³⁹ NHA, HMW, inv. nr. 371.

²⁴⁰ See for both: NHA, HMW, inv. nr. 372.

²⁴¹ NHA, HMW, inv. nr. 373.

received 16 answers.²⁴² Many medical men must have a limited practice, for they were apparently able to spend serious time on doing medical research. Tellingly, some of the writers signed their pieces with their name and the title ‘*Medicinae Doctor, et Practicus*’: clearly it was not self-evident that a doctor of medicine would also have a busy practice. Otherwise, they would not have been able to produce so many medical treatises, which required not just practical experience, but also a detailed knowledge of the medical literature of the day.

Whereas the issues of water management were more or less a peculiarly Dutch issue, on the face of it, diseases and medical issues are universal and can often be discussed without reference to local circumstances. However, this was not how many of the medical questions in the societies were framed, as we already saw for the PUG. Time and again, the questions focus on the relation between disease and local circumstances. Typical in this regard is this question from 1770: “Welken zijn de Ziekten onder de Menschen die uit de natuurlijke Gesteldheid van ons Vaderland voortvloeijen? Hoe kan men zich tegen dezelve behoeden, en door welke Middelen kunnen zij geneezen worden?”²⁴³ An epidemic disease in the northern parts of the Netherlands after 1826 led to a series of questions as well.²⁴⁴ A special set of questions related to this concentrates on the putrefaction of stagnant water and ways to clean it, as well as a question on the medical dangers of burying the dead in churches or in heavily populated areas.²⁴⁵

In the first chapter, we have seen that gathering all that is known on a topic in one place was a very common and highly valued epistemological practice. Obviously, original research was conducted and these encyclopaedic works had to be continuously updated, but a scholar could make a name for himself in this line of work. Within the societies, this was rarely enough, however. Take, for example, the medical question of 1784 about the symptoms, causes, and cures of dropsy: reviewing an entry which collected an impressive amount of existing literature on the topic, S.J. van Geuns hesitated to dismiss the diligent author, but had to since the author did not add any significant and original reflections of his own. A purely encyclopaedic treatment of the question was of no use anymore, at least not to the professional community.²⁴⁶

²⁴² NHA, HMW, inv. nr. 379.

²⁴³ De Bruijn, *Inventaris van de prijsvragen*, 42. Note also how encyclopaedic and ambitious the question is. The winning entry would amount to no less than 846 pages in the eighteenth volume of the *Verhandelingen*!

²⁴⁴ NHA, HMW, inv. nr. 428, nrs. 310-312.

²⁴⁵ Nrs. 96 (1801), 99 (1802), and 103 (1804) for the former, and 156 for the latter.

²⁴⁶ NHA, HMW, inv. nr. 392. Letter dated 12-03-1786. A similar point was made by G. Moll in 1837: “Oppervlakkige compilatie uit aan elk bekende schriften, verhandelingen wier lot het is om door niemand dan

Moral, pedagogical and philosophical questions

The issue of raising children the right way occupied many enlightened citizens during the decades around 1800. The HMW, still a broadly oriented society in this period, took part in this trend by posing two questions on the topic, in 1761 and 1763 respectively, one focussing on bodily exercise (bordering on the medical topics), the other on the moral upbringing.²⁴⁷ The former was answered by medical men exclusively, who went into the right food, exercise and clothing, as well as the best way to deal with children's passions. In regard to the last part, the recommendations of at least one (anonymous) writer were quite progressive: let children play, do not expect too much concentration from them and be cheerful around them.

These moral aspects played an even bigger role in the 1763 question on the moral education of children, a hugely popular prize contest, receiving no less than 40 entries, a huge number in the world of the prize contests.²⁴⁸ Another extremely popular question within the field of ethics was the enquiry whether it was morally justified to take advantage of the ignorance of one's fellow man. About 30 answers were received. In most cases, however, it had to be said that the writers were people "wiens hert beter gestelt is dan zijn verstand."²⁴⁹ Again, the writers on these kinds of issues could have the best of intentions, but their intellectual qualities were not always of the same level. That the society was in general concerned with raising the general level of the lower classes is evident from the 1777 question about de best means to improve the mind and morals (a clear patriarchal dimension can be discerned as well) of 'geringe lieden'. Once again, the query was quite popular, receiving nine proposals. Less successful, but in the same vein, was the 1795 question about the best way to teach physics to the poorer and less well educated part of the population in a way that would be useful to them, and the 1800 question about teaching natural history to children, more popular at eleven answers. Finally, a question in 1813 asked about the right way to teach natural history in a physico-theological vein and specified that this should be indicated both for more and less educated people. A civilizing element is therefore clearly present in many of these educational questions, which all form clear examples of a scientific vision in which service to the nation (social and moral utility) were key elements. Note that some of these

door de adviseurs alleen, gelezen te worden, waaruit kundigen noch onkundigen iets leeren, vermeerderen wel het aantal boekdeelen waaruit de werken eener Maatschappij reeds bestaan, doch draagt niets bij tot het eigenlijk doel van zulke vereenigingen, uitbreiding namelijk van ware wetenschap en kennis." See NHA, HMW, inv. nr. 434. Letter dated 04-03-1837.

²⁴⁷ See NHA, HMW, inv. nrs. 374 and 375.

²⁴⁸ For a discussion of this topic in its larger context, see Willeke Los, *Opvoeding tot mens en burger: pedagogiek als cultuurkritiek in Nederland in de 18e eeuw*. (Hilversum: Verloren, 2005).

²⁴⁹ NHA, HMW, inv. nr. 378. Letter dated 14-02-1767.

questions were posed during the secretariat of Van Marum. Despite his personal preference for the natural sciences and his large influence in the society, he could not determine its course single-handedly, as these examples show. A group of members kept the tradition of socially useful questions alive in the first two decades of the nineteenth century.

In addition to these very practical questions, more philosophically abstract questions were also posed. Take for example this question which was posed in 1768: “Wat word ‘er vereischt tot de konst van het Waarneemen, en hoe veel kan dezelve toebrenge tot volmaakinge van het Verstand?” (nr. 17) This question apparently tried to put empirical epistemology on a surer theoretical footing. A similar question asked about the proper use of analogies in philosophy.²⁵⁰ Here, two of the four entries were to be preferred, but neither was complete. Rather, they were complementary and only if they could somehow be combined, the question would be answered fully. These kind of jury conclusions were not uncommon when the questions were split into a number of sub-questions, not each of one fully satisfactory answered by the writer. One of the last theoretical-philosophical questions was posed in 1816 and asked for the value of deductive reasoning in that discipline.

The HMW also ventured into theology in 1787 and 1789, asking for an appraisal of the proofs for the existence of God by Moses Mendelssohn and Kant, respectively. A lot of the answers came – perhaps unsurprisingly – from Germany. Jury member Hulshoff had expected this: “De regt Bovennatuurkundigen zijn overal dun gezaaid. Zonder toevoer uit Duitschland, dagt ik, zou de schaarsheid groot kunnen zijn”.²⁵¹ This perception that not many Dutch scholars were interested in abstract metaphysical topics seems warranted.²⁵² Judges were also more reserved than usual about their qualifications for judging these questions. D. Wyttenbach thought himself only able to give a justified advice if he re-read all of Kant’s major works. A 1793 question about the utility that metaphysics has brought to humanity was not a success either, in terms of the number and quality of received answers.

Under Van Marum questions relating to the humanities were less frequent. An exception was the question of 1805, which went into linguistics and asked for an explanation of the similarities and differences between the languages of the world, or the 1816 question asking for proof of the proposition that simplicity was the true mark of beauty, truth, and goodness. After 1825 questions in this category do not appear anymore. Historical and literary

²⁵⁰ NHA, HMW, inv. nr. 388.

²⁵¹ NHA, HMW, inv. nr. 394. Letter dated 06-10-1788.

²⁵² See also the 1808 question nr. 129, asking why philosophers differed so strongly about the first principles of ethics but came to such similar conclusions about what the actual moral duties were. Seven out of twelve contestants were German, only two were Dutch.

questions had always been rare in the society, and although an occasional one still appeared in the later decades of the nineteenth century, the focus overwhelmingly shifted to the natural sciences. Among the few exceptions was the 1840 question about the place of Latin and Greek in modern civilization: “Is de studie der oude klassieke Grieksche en Latijnsche letterkunde thans, voor het beschaafd Europa, werkelijk slechts te beschouwen als eene op zichzelf staande *specialiteit*, die men straffeloos kan verwaarlozen, of tegen iedere andere verwisselen, en is zij dus zonder noodzakelijk verband met onze beschaving?”²⁵³ This question reflected on the increasing importance and vitality of modern European languages and the slowly decreasing role of the classics as the accepted foundations of the entire European culture, with its classical ideas about truth, beauty, politics, and science, and represents therefore a very striking investigation into cultural critique. Unfortunately, only one, strongly insufficient answer was received, but the question itself signals a clear awareness about the demise of the classical humanist culture: there were more questions in this period wondering about a justification for the central place of the classics in education.

Political and historical issues

In 1771 an important question was posed asking an analysis of Dutch commercial success and decline, and ways to improve Dutch trade to the maximum of its potential. This question – typical in its early show of public engagement, unlike the later questions by Den Tex – led to more than ten entries, with the winning entry being written by H.H. van den Heuvel, an official of the province of Utrecht who would play a leading role in the founding (1777) of de Oeconomische Tak, the offshoot of the HMW that epitomized the public interest in matters of national concern around 1800.²⁵⁴ More questions concerning commerce were posed in 1779 (nr. 37) and in 1825 (nr. 297) when the society wanted to know to what extent the decline of the Dutch position in world trade was their own fault or whether the blame was with international factors beyond Dutch control.

²⁵³ Cited in De Bruijn, *Inventaris van de prijsvragen*, 277-278. Italics in original.

²⁵⁴ It is also noteworthy that the jury report by Ploos van Amstel, at 37 folio pages, was an essay in itself, as De Bruijn notes (*Inventaris van de prijsvragen*, 44). This is not the only jury advice that turns into something of a scientific article rather than just a short commentary on the main qualities of the submitted piece. Another example is question nr. 43 (asking for a device to measure the velocity of streaming water) led to a review by Hennert with the title “Schets van eene Theorie nopens het bepaalen der middelbaaren snelheid van het stroomend water” of 36 pages, which is also more of an attempt at answering the question itself. In this case, the winning writer (C. Brunings sr.) used Hennert’s piece to amend his own work. See NHA, HMW, inv. nr. 390. In the PUG, Van der Netten reviewed an entry on horse breeds of 21 quarto pages with an essay of 39 folio pages! Remember, these advices were to be read in their entirety in the general assembly. Numan complained, quite rightly, about advices like these: “Het zijn veeleer wezenlijke verhandelingen over de, bij de prijsvragen opgegevene, onderwerpen zelve, dan beoordelingen.” See UA, PUG, inv. nr. 247. Letter dated 27-06-1827.

In 1818, a contemporary public issue was addressed with the Malthusian question whether poverty in Europe (which was perceived to be on the rise) was caused by overpopulation, and if so, what measures could be taken to limit population growth. In the same year, and inspired by the same issue, a question was posed asking to what extent migration and colonization could relieve the pressure of high population density. This last question was also historical, since it asked for a comparison with the ancient Phoenician, Greek, and Roman colonization and their situations with regard to population pressure, a clear case of *historia magistra vitae*, an ideal which would be debated later on (see below).²⁵⁵ The subject of poverty was broached once more in 1847 by A. de Vries who asked for an analysis of the cause of increasing poverty in the Netherlands: was it overpopulation, a failing poor relief or excessive taxes?²⁵⁶ Throughout the first half of the nineteenth century, social issues kept appearing on the agenda of the HMW occasionally, reflecting the fact that, although social commitment became less visible in the scientific societies in the nineteenth century, it did not disappear altogether, and at least some members thought it fitting to introduce this type of questions throughout the century.

During the middle of the nineteenth century, the HMW also posed a few non-scientific questions which had been proposed by the legal scholar and member of parliament C.A. den Tex: one asking for an essay about the contemporary problem of competition and monopolies in Dutch industry (nr. 562, 1846), one asking about the reasons for the emergence of the social philosophies of Robert Owen, St. Simon, Fourier, and communism (nr. 579, 1847),²⁵⁷ and finally a similar question in 1849 (nr. 620) asking for “een wetenschappelijk staatshuishoudkundig onderzoek van den door sommigen thans beweerden strijd tusschen de belangen van kapitaal en die van arbeid, en van de plaats, die beiden in voortbrenging, verdeeling en verbruiking van rijkdommen bekleeden.”²⁵⁸ None of these three questions received an answer, however.²⁵⁹ This in striking contrast to similar questions related to contemporary social and political developments that usually received a substantial number of entries 50 years earlier. It is hard to say, however, if the lack of interest this time round had to

²⁵⁵ The idea of history as *magistra vitae* is also present in an 1827 question (nr. 320) by Van Tets van Goudriaan (at the time minister of finance) on Charles V and Philips II which ended with the question what lessons one could draw from this history for morality and politics.

²⁵⁶ NHA, HMW, inv. nr. 440, question 581. J. de Bosch Kemper took the gold medal in 1815.

²⁵⁷ Den Tex thought these systems sufficiently discredited, but wanted to know which social factors had led to their emergence and what could be done to remedy those problems *within* the existing political order (an unsurprising position for the very moderate liberal that Den Tex was).

²⁵⁸ De Bruijn, *Inventaris van de prijsvragen*, 337.

²⁵⁹ In 1814, a question by Teissèdre de l'Ange asking for an evaluation of the cultural and moral consequences of the political transformations of the last 25 years also received just one insufficient answer.

do with a decline in public engagement, or maybe with the fact that this type of question was rather uncommon for the HMW at this point in time and might not have reached its intended audience. In any case, public involvement with social issues, if at all still extant around 1850, was no longer mediated by the scientific societies.

In 1808 a sensitive topic was proposed: the question whether Haarlem – the seat of the HMW – could boast the inventor of the printing press, in Samuel Coster, or whether Gutenberg was earlier. As reviewer Van Lennep noted, this was a tough question to judge: if the HMW would publish a piece pro-Coster, it would be suspected of being biased, while a negative judgement would harm the prestige of the society. Strikingly though, when judging a new round of entries six years later, he was entirely in favour of publishing one entry which would promote the “roem van het vaderland”.²⁶⁰ Also in 1808, an investigation was launched into the peoples responsible for the *hunebedden* in Drenthe, requiring a comparison with similar megalithic structures elsewhere in Europe.²⁶¹ This is an example of the type of question which would not reappear in the HMW, but was popular in the PUG around the middle of the nineteenth century.

A different set of historical questions was posed in the first half of the nineteenth century, concerning the criteria for a good historian. The first two questions (proposed by H.C. Cras and both won by E.A. Borger)²⁶² asked whether the historian was supposed to be more than a chronicler or whether he should also draw moral lessons from the histories he reported (1813) whereas the second (1815) asked if the historian was allowed to incorporate source-based but fictitious first-person speeches in his historical accounts.²⁶³ A later set of questions (1821 and 1828) asked for the differences between different styles of history, specifically what was called pragmatic and philosophical history.²⁶⁴

Criteria

Just like the PUG, the HMW did not reward the efforts of prize contestants easily. Out of a total of 1206 questions only 169 received a prize worthy entry, although a significant number

²⁶⁰ NHA, HMW, inv. nr. 409. Letters dated 17-04-1810 and 08-04-1816, respectively. See about this question also Bierens de Haan, *Gedenkboek*, 92-96.

²⁶¹ The winning entry by N. Westendorp also contained a number of drawings: apparently this contestant, who lived in a village in nearby Groningen, had gone to the trouble of conducting fieldwork.

²⁶² Cras posed a similar question in 1814 about reliable criteria for judging authenticity in philology.

²⁶³ The first question received an answer of the famous dramatist A. von Kotzebue, who was also extremely popular in the Dutch theatrical world.

²⁶⁴ Nrs. 251 and 333. Here, Matthijs Siegenbeek designed at least one of the questions. The involvement of important scholars such as Siegenbeek and Cras shows that the HMW was not entirely dominated by the natural sciences yet, although they rarely managed to get a humanities question on the agenda.

also received no entries at all. As one anonymous writer remarked in 1760, this was not a smart policy when it came to encouraging more people to take up their pen, saying

dat het eenigsins teegen uwe eigene oogmerken, om de waarheit te ontdekken, schijnt te strijden, dat gijlieden somtijds de prijzen inhout, dewijl er veele voorstellen zijn van dien aart, van dewelke geene volkooome voldoende oplossingen kunnen gegeeven worden, hoedaanigen ik dit ten minsten aanmerke, waarin uwe edelen vraagen (soo ik meen) welke de natuurlijke oorzaaken zijn waarom de ziekte onder het rundvee nu langer duurt als in de voorgaande ete [sic] waarvan mijns bedunkens geen sterveling reedenen zal kunnen geeven, welke ten vollen voldoende zijn.²⁶⁵

Having seen the long-winded formulations of some of the questions, we can only agree with this writer that achieving comprehensiveness was a tough task, especially in these earlier questions. The reviewers usually praised contestants for being so well-intentioned (the phrase ‘welmeenend mens’ is often used), but this could not be sufficient ground for awarding a medal. However, an entry that did not receive a prize was not necessarily bad: many entries were actually praised by the reviewers but ultimately rejected because they did not exactly answer the question. This was one of the major disadvantages of the questions: it was not always easy to guess the exact intention behind them, and one could end up writing an excellent essay that did not do what the writer of the question wanted. Van Breda summarized this feeling: “Het doet een onaangenaam gevoel ontstaan, wanneer men eene goed geschrevene verhandeling, eene verhandeling, die men met genoegen leest, evenwel niet kan goedkeuren.”²⁶⁶

The criteria for the technical questions usually were, as seen before, whether the proposed remedy to the problem was technically possible and, if so, whether it was not too expensive. As seen earlier, originality was a major requirement for winning prize contests, but in the very practical questions, aimed at improving agriculture and industry, too much originality could be a bad thing. In this regard it is worth citing at length the advice of Herman van Deyl, judging an improving design voor water mills:

Misschien zal door anderen adviseurs werden aangemerkt, dat er bijna niets nieuws in die antwoorden is: dit is zoo; Maar hun behoord aan te merken, dat al wat nieuws is, eerst 25 a 50 jaaren teegens alle vooroordeelen, als teegens een geweldige stroom moet oproeijen; en dat men dus zeer wel doet, ten algemeenen nut, die zaaken voor te stellen, die reeds een gedeelte der tegenstand te boven zijn; hier in zal men gemaklijker slaagen, om dezelve in gebruik te brengen, want het gebruik is het waar uijt het algemeen nut moet voortvloeijen[...] het scheidnd haast een eigenaart van onze natie; of in de natuur der menschen te zijn, van liever aan hunne vooroordeelen te blijven hangen: dan onpartijdige waarnemingte te doen, en zig daar na te schikken; Ja het scheidnd haast dat het levende

²⁶⁵ NHA, HMW, inv. nr. 372. Letter dated 01-02-1760.

²⁶⁶ NHA, HMW, inv. nr. 440. Letter dated 07-05-1849.

geslagt ten tijde van een ten algemenen nutte vinding, eerst dood moet zijn, eer die vinding goed is.²⁶⁷

Once more, we see that, if the purpose of science is the material wellbeing of the nation, originality is much less of a criterion than in judging ‘pure science’. Different goals of science lead to different criteria of judgement. The major issue for practical and technical questions is feasibility: and acceptance of the innovation by the larger population is therefore a key issue.

However, theory was not ignored completely. Around 1800, the reviews of these technical questions emphasize more and more that the practical solutions should be derived from up-to-date theoretical knowledge of science: Reinwardt and Van Marum criticized a number of entries of the 1800 question (repeated multiple times until 1814) about improved ways of fertilization for showing insufficiently how their measures were derived from the latest developments in botany.²⁶⁸ And reviewer G. Moll made clear what he expected from a good technical prize essay: treatment of the question (*in casu* whether steam mills were to be preferred to windmills) should be decisive and leave no room for doubt because science was not helped by a number of indecisive calculations.²⁶⁹

Plagiarism was also noted sometimes, and the society was not amused about this. An 1821 entry by H. Antheunis on oysters turned out to be copied from the *Dictionnaire d’histoire naturelle*. Van Marum almost decided to publicly shame the author by making known his name to the public as *Plagiaris*.²⁷⁰ Even the great chemist Justus Liebig was chided when he sent in an entry that was basically an excerpt from his own earlier work.²⁷¹ In the PUG in 1831, S.J. Galama did something similar, by submitting an essay that was based on an earlier entry for the HMW.²⁷² In a meteorological question of 1837, Van Marum thought it wise, therefore, to add: “Men verlangt van al hetgeen men ter beantwoording bijbrengt, de

²⁶⁷ NHA, HMW, inv. nr. 396. Letter dated 12-01-1792. It should be noted that Van Deyl spoke from personal frustration as well: an innovative mill-design of his own hand had not found acceptance among his fellow countrymen.

²⁶⁸ NHA, HMW, inv. nr. 402.

²⁶⁹ NHA, HMW, inv. nr. 427, question nr. 309.

²⁷⁰ NHA, HMW, inv. nr. 420, question nr. 232.

²⁷¹ According to De Bruijn the reviewers made a mistake here in dismissing a famous figure like Liebig (De Bruijn, 209). However, judging by the reviews, the reviewers were quite aware that Liebig was the writer and they held him in high esteem based on his earlier work, which is why they saw this act of self-plagiarism as disappointing and insulting to the society. Said Reinwardt: “het moet ook ten hoogsten onze verontwaardiging opwekken, door de minagting, die de schrijver met hetzelfde aan de Maatschappij te hebben durven aanbieden, jegens dezelve heeft aan den dag gelegd, en dat wel een schrijver die boven zoo vele anderen aldoor getoond heeft in staat te zijn dit onderwerp grondig te behandelen en die aan het scheikundig publiek bij andere gelegenheden onderscheidene schoone, doorwrochte en hoogstbelangrijke verhandeligen geschenken heeft.” Van Breda made the same point: did Liebig really think we would not recognize this for what it is? Dutch chemists might not be famous in Europe, but they were aware of the work of Liebig. See NHA, HWM, inv. nr. 429, question nr. 321.

²⁷² Reviewer Pennink caught him red-handed, however. UA, PUG, inv. nr. 249.

schriften te zien aangehaald, waaruit men het bijgebragte ontleend heeft, of waarop hetzelfde geground is.”²⁷³ It was paramount to combat the inadmissible practice of what one reviewer called ‘letterdieverij’.²⁷⁴

The reviewers complained regularly about the size of the works they were presented with. This was understandable, given the voluntary nature of their work, and the very time-consuming business of reading a manuscript (not always neatly written, as some also noted) and commentating on it, was not made any easier by the regular occurrence of two to four-hundred page works. For that reason, adviser A. Perrenot would have liked the HMW to establish a rule specifying the maximum length of entries, a measure already undertaken by the Stolpiaansch Legaat.²⁷⁵

²⁷³ De Bruijn, *Inventaris van de prijsvragen*, 260.

²⁷⁴ UA, PUG, inv. nr. 243. Letter dated 25-01-1820.

²⁷⁵ NHA, HMW, inv. nr. 380. Letter dated 16-04-1770.

4.3 Why should science be pursued? Functions and goals of science

The HMW was founded by citizens who were concerned over the (moral) decay of the nation.²⁷⁶ In the original name of the society, the regents had mentioned their goal: “ter bevordering der welvaart van hun Vaderland”. Lulofs – who as we will see in the next section was very active in the early HMW – thought this addition redundant, saying: “De zaaken, die nuttig zijn voor het vaderland en voor den Godsdienst verdienen alleen den naam van Weetenschappen.”²⁷⁷ Note that whereas utility today usually evokes more narrow economic connotations, it also very much had a moral and religious dimension when it was used during the eighteenth century.²⁷⁸ A great example of such a socially concerned figure is Petrus Camper, one of the more famous eighteenth-century Dutch scholars, who was a member of the HMW as well, although he was not very active in the society.²⁷⁹ Camper was one of those wealthy amateurs, in this case “much more a seasoned Frisian regent who dabbled in science than a pure-blooded scientist who happened to have married a woman of more than average means.”²⁸⁰ He showed his social concern by working on cattle plague, public health, obstetrics and education – all topics that also concerned the HMW and PUG in the eighteenth century.²⁸¹ At the same time he also had a strong interest in arts and classical culture: “Camper’s interest in art, medicine, and antiquity are ingredients of a larger culture of erudition of the virtuoso, showing a level of integration still fully intact in the Netherlands during the third quarter of the eighteenth century.”²⁸² In this he exemplifies a culture that was still quite vibrant in the Netherlands around 1800, although signs of different views of science were also starting to crop up.

Apart from this voluntary participation in society life to improve Dutch society, the emphasis on national utility was presumably also encouraged by the directors with high public office. Despite the largely self-governing nature of the HMW, relations with the government were close, if only because the directors were often recruited from the same circles as the

²⁷⁶ Dick Schenkeveld, “De Hollandsche Maatschappij der Wetenschappen te Haarlem”, in: Remieg Aerts (ed.), *Geleerden en leken: de wereld van de Hollandsche Maatschappij der Wetenschappen, 1840-1880* (Haarlem: Hollandsche Maatschappij der Wetenschappen, 2002), 9.

²⁷⁷ Cited in Bierens de Haan, *De Hollandsche Maatschappij*, 8.

²⁷⁸ Although utility in the HMW would also often be understood in the more specific sense of water management as a way to safeguard the economic wellbeing of the nation: see Bierens de Haan, *De Hollandsche Maatschappij*, 18.

²⁷⁹ See Klaas van Berkel and Bart Ramakers (eds.), *Petrus Camper in Context: Science, the Arts, and Society in the Eighteenth-Century Dutch Republic* (Hilversum: Verloren, 2015).

²⁸⁰ Goffe Jensma, “‘Aut bene, aut non’. Petrus Camper as a Frisian regent”, in: Van Berkel and Ramakers, *Petrus Camper in Context*, 43.

²⁸¹ Pieter Caljé, “Petrus Camper and the demise of the Franeker academy”, in: Van Berkel and Ramakers, *Petrus Camper in Context*, 20-21.

²⁸² Freek Schmidt, “A passion for architecture. Petrus Camper and the Groningen town hall”, in: Van Berkel and Ramakers, *Petrus Camper in Context*, 302.

major figures in government. Most of these relations remain out of sight in the archives because of their informal nature. An exception is formed by the 1805 question, commissioned by the Amsterdam city council, concerning solutions for the silting up of the IJ. It was a pressing matter and the city was generous in its monetary rewards: if the proposed solution was executed and would work for at least six years, a sum of 10.000fl. would be paid to the writer. The question reached the society through Van Eys, C. van Lennep and Van Gelder de Neufville, predictably members of both the city council and directors of the HMW. No less than 19 hopeful writers participated in this contest.²⁸³ In 1821, a similar question was posed, on request of the king himself, with a 2.500fl. bonus for the winning entry.²⁸⁴

An interesting view on the task of the society was provided by G. van der Voort – who had won a question judging Mendelssohn’s proof for the existence of God – when judging the similar question on Kant. Since the jury was still out on the validity of Kant’s arguments, he proposed publishing all the sufficient entries, some of which supported Kant, while others dismissed him. In this way, the public would not receive a definitive answer, but could draw their own conclusions:

Dan, daar het voor t algemeene belang zeer voordeelig is, het Kantiaansch bewijs zo wel in al zijn kragt voorgesteld te zien, als met eenige zwaarigheden bekend gemaakt te worden, die men er, met meerder of minder reden, tegen in kan brengen; zoo ware het te wenschen, dat de maatschappij konde goedvinden, de vier gemelde verhandelingen allen, door den druk gemeen te maaken.²⁸⁵

Contributing to the public opinion by presenting themselves with a range of perspectives on Kant was a rather progressive and almost postmodern approach to the issue. In general, however, the society took it upon itself to decide which entries were worthy of publication and represented the best solution to the problem.

The formulations and topics of the later questions of the HMW are more limited and less ambitious than earlier. As mentioned above, many of the later entries are often not much more than a series of observations, what we would now call a dataset. As Rob Visser has put it, this rather narrow conception of science limited itself to “beschrijven, experimenteren, meten en registreren” and was therefore a “tamelijk plat empirisme.”²⁸⁶ The HMW now shied away from attempts to make larger theoretical inferences, let alone devise new comprehensive theories. The larger point that is important here is that seeing science as a goal in itself, or seeing it as an instrument leads to very different criteria of what good science is. If knowledge

²⁸³ NHA, HMW, inv. nr. 406.

²⁸⁴ See De Bruijn, *Inventaris van de prijsvragen*, 168-169.

²⁸⁵ NHA, HMW, inv. nr. 395. Letter dated 05-02-1791.

²⁸⁶ Rob Visser, “De prijsvragen van de Hollandsche Maatschappij 1840-1880: koersverandering en neergang”, in: Aerts, *Geleerden en leken*, 53.

is pursued for its inherent value, than originality will be key, whereas a utilitarian conception of science will be less concerned with that and more focussed on reliability and cost-efficacy.

4.4. Who were active in the society? Development of membership²⁸⁷

In the first years of the society, Johannes Lulofs (1711-1768) acted time and again as adviser. Since he was professor of mathematics, astronomy and philosophy at Leiden, he was not specifically trained as an engineer or expert on watermanagement, but he was strongly interested in those issues and apparently possessed the necessary expertise. Consequently, he commented on those early prize contests – also those on moral issues – almost without exception, albeit sometimes in acknowledgement of his own lack of expertise, remarking “dat ik in de zaaken, die de zeeweeringen betreffen, zeer weinig bedreeven ben, door dien ik nooit gelegenheid gehad, of sterk gezogt heb om mij [er] in bekwaam te maaken.”²⁸⁸ In general, he was almost the single reviewer in those early years and numerous letters of his can be found in the archives. To his credit, Lulofs did take his task as reviewer very seriously: when he had to judge a question on breaches of dikes, he took the trouble to go to the location of a recent breach to make some observations himself.²⁸⁹ In his conscientiousness as a reviewer and the broad range of topics he commented upon, Lulofs was typical for a number of early reviewers who were competent, or thought themselves to be so, on many topics, and were willing to spend significant effort on the reviewing process. As I have indicated earlier, reading the lengthy entries could be very time-consuming, and most reviewers wrote detailed critiques, some even including lists of grammatical and spelling errors.

It should be noted that the focus on practical questions on matters that related to the everyday life of a lot of Dutch citizens - and water was a danger many of them faced up close - could and did lead to entries by people who were not at all up to their task. The reviewers sometimes did note the praiseworthy patriotism behind those efforts, but more often they expressed their amazement at the singular inaptitude of those writers. In a review of an entry on the Petten-beach question (1754), reviewer Engelman remarked that this “opstel zo ongerijmd doorweven met andere beuzelagtige voorstellingen, mij het ongerijmste ontwerp

²⁸⁷ See Bierens de Haan, *De Hollandsche Maatschappij*, for lists of all the directors (302-329), Dutch members (329-359) and foreign members (359-375).

²⁸⁸ NHA, HMW, inv. nr. 370. Letter dated februari 1755.

²⁸⁹ NHA, HMW, inv. nr. 371. Letter dated 21-02-1760.

voorkomt, dat in gezonde hersenen vallen kan.”²⁹⁰ And Lulofs drily judged one writer on the same question to be a man who “vertoont het caraceter van een vroom en welmeenend mensch; maar dit is niet genoeg om het land te redden.”²⁹¹ Sometimes the medical men did not exactly inspire confidence either with their entries. Joannes Grashuis disqualified one writer as someone with “het karakter van een eenvoudigen en onnozelen chirurgijn op een boeren dorp, en niets anders.”²⁹²

This was the downside of an active public: some of the entries were written by entirely unqualified amateurs. A question about the physiology of plants, for example, received some bizarre entries, among them one by a certain L. Schuinman who answered the question based on his idiosyncratic natural philosophy which seemed inspired by the ancient theory of the four elements. Reviewer J. Willemse said: “ik moet verklaaren, dat ik woorden geleezen hebbe, zonder meer. Ik heb er niets van verstaan, en de schrijver verstaat er gewisselijk ook niets van. Na de leezing wist ik naauwelijks, waarover ik mij meer moest verwonderen: of over de menschelijke domheid, of over derzelve verwaandheid”.²⁹³ Obviously though, not all amateurs were of this limited intellectual calibre. After all, when there were limited institutional options for qualified men of science to make a profession out of their research, being an amateur and being a capable scientist were not mutually exclusive. The *Bataafsche Genootschap*, for example, was founded by Steven Hoogendijk, a watchmaker with a lot of technical expertise on a wide range of topics and an early advocate of steam power.

It is understandable that a reviewer focussed on the intellectual quality of the entry under consideration. From the perspective of the history of science, it should however be stressed as least as much that competing for prize questions by ordinary people in this fashion, is evidence of a closer link between the world of science and that of the larger public. Clearly, many of these issues have become too complicated today for many people to be able to meaningfully contribute to them, but this was already the case in the eighteenth century. The difference here is only of degree. Nowadays, however, few non-specialists would even think of trying to contribute to topics outside their own sphere of expertise, whereas it was not

²⁹⁰ NHA, HMW, inv. nr. 370. Letter dated 03-01-1755.

²⁹¹ NHA, HMW, inv. nr. 370. Letter dated februari 1755. The entry in question was submitted by a protestant minister who had apparently proposed to fund maintenance of the coastal areas by urging his flock from the pulpit to donate to that worthy cause. Lulofs thought this rather naive: “De man heeft te weinig ondervindinge omtrent de gesteldheid van het menschelijk hart, als hij denkt geld of schepen te krijgen door aanmaaninge van leeraaren (al stondt één van de apostelen op den predikstoel) of door het oprichten van een ridder-order. Het theologische laat ik aan uwe eerwaarden over, ik oordeele imant godvrugtige opreghtheid lof, maar geen gouden medaille waardig.”

²⁹² NHA, HMW, inv. nr. 379. Letter dated 27-03-1768.

²⁹³ NHA, HMW, inv. nr. 394. Letter dated 08-01-1788.

uncommon in the eighteenth century. The desire ‘to save the country’, as Lulofs put it, apparently moved many to apply their intellectual powers, however limited, to matters of public welfare. The 1755 question, for example, - asking how to make the dune areas economically more profitable - was answered, among others, by a certain H.A. Schurman, who made a living producing vinegar.²⁹⁴ And one writer on the topic of the physical upbringing of children, did not include his name in the *biljet*, but wrote: “Wat baat hier mijnen naam; daar ik geen prijs, maar ‘t nut beoog?”²⁹⁵ And this was indeed the goal: the same question was interpreted by the jury-member Jacob Hovius as aiming not at “jonge artzen kundiger te maken, maar wel om ouders hulpmiddelen aan de hand te geven”.²⁹⁶ Making a name for oneself was not important for those writers who hoped that their efforts would contribute to the moral and material wellbeing of the faltering Republic. In this perspective, receiving a prize was not so much a sign of entry into the scientific world, but more of an encouragement to keep on writing for the public wellbeing. As the lawyer G. van der Voort wrote in a letter expressing his gratitude for winning a medal: this was “aanspooring [...] om mijne geliefkoosde bezigheden met vernieuwde lust voor te zetten.”²⁹⁷

The question concerning moral education of 1763 led to numerous entries. Besides the winner, written by the well-known secretary of the Prussian Academy of Science, Samuel Formey, silver medals went to dr. Allard Hulshoff (a minister well versed in philosophy and medicine), Henri Abraham Chatelain (a manufacturer of luxury textiles (!)), K. van der Palm (proprietor of a boarding school), as well as an anonymous author. Two years later, Hulshoff and Formey were also among the winners of the question about the morality of profiting from ignorance, as were the ministers W. de Vos and P. Franck. In both cases, a significant number of the entries were written by non-Dutch writers. Interestingly, the number of foreign entries was much lower in other topics. Part of the reason no doubt is that more people felt qualified or able to give an opinion on this topic which, after all, concerned many of them from personal experience. Among the competitors for these questions were medical men, but also military figures, merchants, artists such as the painter-engraver P.A. Wakkerdak, and a

²⁹⁴ NHA, HMW, inv. nr. 371. A similar question in 1796 was answered by a Jacob Pronk and an anonymous writer, who described themselves as labourers in Scheveningen, who had read about the question in a Haarlem newspaper. The reviewers were unaware of this but noted anyway that the writers should stick to working with their hands. The interesting point is that such common people participated in a scientific society at all. See for this case NHA, HMW, inv. nr. 399, question 79-80.

²⁹⁵ NHA, HMW, inv. nr. 374.

²⁹⁶ NHA, HMW, inv. nr. 374. Letter dated 05-04-1762.

²⁹⁷ NHA, HMW, inv. nr. 394. Letter dated 26-05-1789.

number of educational professionals.²⁹⁸ Once again though, this show of social commitment by a diverse group of people did not necessarily lead to quality entries. Lulofs at least, showed himself to be no believer in the intellectual potential of those possessing less learning than he did, when he said: “Zulke quaestien moeten beantwoord worden door fraaie vernuften die op bovenkamers wonen en die teffens het menschelijk hart door ondervindinge kennen, en niet door halfgeleerde kooplieden.”²⁹⁹

Increasingly, however, the amateur was of no use to the man of science. An answer, around 1825, on a question about harmful insects in greenhouses was answered by a gardener who had found ways to successfully fight them, based on his extensive practical experience. For Reinwardt, this was not a sufficient entry, even if the indicated means might work. Pure empirical work, unaware of the causes of the damage the insects did, their constitution, etc., was not sufficient.³⁰⁰ A question about lung disease among cattle in 1842 received an entry in 1846 by a practising veterinary. The designer and reviewer of the question, A. Numan, made very clear what he thought about this entry by a man outside the scientific establishment:

De schrijver komt ons voor, een practisch vee-arts te zijn, die als zoodanig eene ruime ondervinding heeft omtrent de longziekte, en die dezelve, *voor zoo ver als dit onder het bereik valt van den gewonen practicus*, met naauwkeurigheid en oplettenheid [sic] heeft waargenomen. Zijn ijver en eerezucht, om aan de bedoelingen der Maatschappij te voldoen, verdienen lof; doch hij heeft getracht eene taak te volbrengen, welke voor zijne krachten te zwaar is geweest. Waarschijnlijk ontbrak het hem daartoe ook aan de noodige microscopische [sic] werktuigen en aan de scheikundige hulpmiddelen, terwijl het uit des schrijvers eigene verklaring blijkt (bladz. 27), dat het hem somwijlen aan tijd en gelegenheid heeft ontbroken, om de noodige ontleedkundige nasporingen, waarop het hier vooral aankwam, te doen.³⁰¹

Had science become too hard for a practising man of medicine within the space of a few decades? Or had the perception of the status of the scientist changed and was the dismissal of the practical amateur an attempt to protect the prestige and status of professional scientists? The reviewers argued that science had become too time-consuming, required complex instruments, and also an intellectual level and training that this veterinary apparently did not possess. There was some truth in this: clearly, much of the progress being made in physics was impossible without a sophisticated laboratory. It is undeniable that the nineteenth century was the century in which the expert and specialist became more and more prestigious and important – both in science and society.³⁰² But were the experiences of gardeners and

²⁹⁸ NHA, HMW, inv. nrs. 375-376.

²⁹⁹ NHA, HMW, inv. nr. 378. Letter dated 19-02-1767.

³⁰⁰ NHA, HMW, inv. nr. 420, nr. 235.

³⁰¹ NHA, HMW, inv. nr. 439. Letter dated 28-04-1846. My italics.

³⁰² See Frans van Lunteren, Bert Theunissen and Rienk Vermij (eds.), *De opmars van deskundigen: souffleurs van de samenleving* (Amsterdam: Amsterdam University Press, 2002), 14.

veterinaries really that useless to botanists and doctors? This process of the exclusion and disparagement of the amateur seems to have been part of a process whereby the societies shifted from an egalitarian to a more elitist view, as Mijnhardt has argued.³⁰³ This was especially the case within the KNAW, where amateurs were completely ousted, and professional scientists were only elected if they were of the highest calibre. Within the HMW and the PUG, this procession did not go quite as far, but the heyday of the amateur was definitely gone by 1850 and would not return.

The exclusion of the amateur was deplored by some. J. van der Hoeven, for example, argued that elsewhere in Europe, these amateurs could still be very useful to science, but that a similar socially committed spirit was lacking in the Netherlands:

Het Noorden van Europa, Zweden en Denemarken vooral, maar ook Groot-Brittanje, zijn ons hier tot beschamende voorbeelden, waar ambtenaren van verschillenden rang, officieren ter land- en zeemagt, arme dorpspredikanten en edellieden dikwerf eene zoo grondige kennis van de natuurlijke geschiedenis bereiken, dat zij somtijds door geleerden, wier studie eenen ruimere omvang heeft, in speciale gedeelten geraadpleegd en als leeraars geëerbiedigd worden.³⁰⁴

In this analysis, the lack of amateur involvement is more an outcome of an underdeveloped sense of public engagement. It is an interesting question for further research to what extent the public was indeed less interested in contributing to public affairs.

During the eighteenth and nineteenth century, the ideal of the broadly educated man of science, moving with ease in any field of learning, continued to be attractive to a significant number of intellectuals, while others were more sceptical. Reviewing an entry on the utility of psychology as a discipline with regard to raising children, J. Petsch remarked on the impossible ambition of one writer that the entry was below par and therefore:

Ik mene derhalven gene de minste poging te moeten doen om de Maatschappij den schrijver te leren kennen als Logicus, -Mathematicus, -Metaphysicus, Physicus, Anatomicus, Historicus, Ethicus, Jurisconsultus, Politicus, Theologus enz. - (Dit alles schijnt egter onze schrijver, die meer dan eens van halfgeleerden en weetnieten met verachting spreekt, te zijn, of ten minsten te willen zijn).³⁰⁵

While mastering all those disciplines might be hard, reviewing across a broad range of topics was not considered much of a problem, judging from the many advisers who pronounced on a diverse set of questions. Van Marum and C. Brunings were both predominantly interested in

³⁰³ W.W. Mijnhardt, "De Akademie in het culturele landschap rond 1900", in: K. van Berkel (ed.), *De Akademie en de tweede gouden eeuw*. Bijdragen tot de geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen, vol. 6 (Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, 2004), 15-42.

³⁰⁴ NHA, HMW, inv. nr. 440. Question nr. 554. Practical skills as such were still valued though: in the PUG Von Baumhauer and Olland invented a meteorological instrument and Olland was praised as a "geniaal practicus". See UA, PUG, inv. nr. 73, report on yearly assembly 1882.

³⁰⁵ NHA, HMW, inv. nr. 385. Letter dated 07-02-1778.

the natural sciences, but they were also the judges on the prize question concerning the historical development and use of the discipline of metaphysics.

One example of a broadly interested contestant is J. Konijnenburg, a minister and professor at the Remonstrant school in Amsterdam. The prize contests in which he participated between 1813 and 1830 concerned bird migration (which he won), the qualities of lump lime vs. shell lime, the value of translating classical poetry in Dutch (again successfully), the (dis)advantages of snow and frost for agriculture, the professional ethos of the historian, the introduction of exotic plants in the Netherlands, the difference between a ‘pragmatic’ history and a philosophical or political treatise, the matter of bird migration once again, as well as of migrating fish, and the unique brooding procedure of the cuckoo.³⁰⁶ Not surprisingly, most of his entries were rejected because they showed not nearly enough familiarity with the subject, but Konijnenburg also won a number of medals. He was maybe exceptional in the unusual range of subject he participated in, but to a lesser extent, figures like him were not uncommon in the earlier decades of the scientific societies.

As mentioned before, Martinus van Marum played a major role in changing the course of the society in a more exclusively scientific direction.³⁰⁷ Among other things, he was very active in judging entries during his time as secretary. In general, it seems that the directors had a large hand in deciding which questions were published each year.³⁰⁸ Under Van Marum we see a number of questions on electricity, a specialisation of his, as well as many questions on botany, the topic on which he had written his dissertation and that obviously still intrigued him. Van Marum had gotten into a conflict with the directors of the Teylers Foundation, who held onto a much broader idea of science than his utilitarian ideology. As an influential and somewhat authoritarian figure, Van Marum could influence the course of the HMW to a serious extent, although there were still a substantial number of non-scientific questions under his secretariat, indicating that he did not fully control the society.³⁰⁹

Key members – as seen by the number of prize questions they wrote or the amount of jury reports they contributed – were C.G.C. Reinwardt (also an active PUG-member), S.J. Brugmans, J. Van der Hoeven, F. Kaiser, J.L.C. Schroeder van der Kolk, V.S.M. van der Willigen, Hugo de Vries, C.K. Hoffmann, H.A. Lorentz and M.W. Beijerinck. Many of

³⁰⁶ The corresponding numbers are: 119, 145, 152, 158, 172, 187, 191, 251, 280, 281, and 331.

³⁰⁷ See A. Wiechmann and L.C. Palm (eds.), *Een elektriserend geleerde: Martinus van Marum, 1750-1837* (Haarlem: Enschedé, 1987) and R.J. Forbes (ed.), *Martinus van Marum: Life and Work*. 6 vols. (Haarlem: Hollandsche Maatschappij der Wetenschappen/Tjeenk Willink, 1969-1976).

³⁰⁸ Rob Visser, “De prijsvragen van de Hollandsche Maatschappij 1840-1880: koersverandering en neergang”, in: Aerts, *Geleerden en leken*, 50.

³⁰⁹ Bert Theunissen, “Martinus van Marum, 1750-1837: ‘Ten nutte en ten genoeg den ingezetenen’”, in: Wiechmann and Palm, *Een elektriserend geleerde*, 11-32.

these prominent figures were active in the natural sciences, but also strongly interested in the humanities. HMW secretary Von Baumhauer was a chemist, but also had a doctorate in the humanities. The famous ophthalmologist Donders also had a universal interest and the same goes for Jan van der Hoeven. However, the majority of the questions they proposed had to do with their own specialisations.

A final development in membership and participation that stands out in the scientific landscape is the fact that so many entries and winning pieces came from Dutch writers in the earlier decades of the HMW's existence. Gradually, the HMW became more interested in connecting to the international developments in pure natural science, however, and, as we have seen, this led to a decrease in the interest and participation of a larger group of fellow countrymen. The numbers on Dutch and foreign prize winners confirm this: under Van der Aa the percentages of Dutch and foreign winners were 76% and 24 % respectively, a gap that became smaller under Van Marum when it was 60-40, but switched decisively under Van Breda when 74% of winning entries was by a non-Dutch author.³¹⁰ The foreign entries were predominantly German, but occasionally also from Italy or France.³¹¹ There was even an entry from an anonymous scientist from Chicago in 1878 and the PUG awarded the American Frank W. Very, from the observatory in Allegheny in Pennsylvania for his observations on the moon in 1890. In a certain sense, some of the national barriers which had become higher with the focus on improving Dutch society around 1800 were lowered again and the contact with the international scientific world was strengthened by the societies during the nineteenth century.

Lastly, a note on the involvement of women in the scientific societies. In both this and the preceding chapter I have always used the male pronoun, because the overwhelming number of writers and jurors were men. The number of women replying to prize contests is almost zero.³¹² This did not mean that they were forbidden from competing: when the PUG debated allowing women to enter the society as members in 1893, they realized that their earlier regulations had not explicitly stated that the society was limited to men, but they had

³¹⁰ De Bruijn, *Inventaris van de prijsvragen*, 27.

³¹¹ See Annemieke Kouwenberg, *'De kennis der Duitse taal is voor een geleerden hedendaags onontbeerlijk': Duitse natuurwetenschappen en pedagogiek in Nederlandse genootschappen rond 1800* (Amsterdam: APA-Holland University Press, 2010).

³¹² M. Bosch, *Het geslacht der wetenschap: Vrouwen en hoger onderwijs in Nederland 1878-1948* (Amsterdam: Sua, 1994); Grietje Noordenbos, *Vrouwen in Academies van Wetenschappen: van uitsluiting tot uitzondering* (Zutphen: Walburg Pers, 2000); Margaret Jacob and Dorothee Sturkenboom, "A women's scientific society in the West: the late eighteenth-century assimilation of science", *Isis* 94(2) (2003), pp. 217-252; Dorothee Sturkenboom, *De elektrische kus: over vrouwen, fysica en vriendschap in de 18de en 19de eeuw* (Amsterdam: Augustus, 2004); Claudette Baar-De Weerd, *Uw sekse en de onze: vrouwen en genootschappen in Nederland en ons omringende landen (1750-ca. 1810)* (Hilversum: Verloren, 2009).

always assumed that this was the spirit of the laws.³¹³ Most members were not necessarily against female participation. N. Beets, in 1870, had already expressed his conviction that female participation would be only a matter of time.³¹⁴ Women were accepted in the PUG from 1894 in a vote which went 56 against 28. Some female members were appointed in the following years: in 1895 the jurist Jeltje de Bosch Kemper and the doctor Catharina van Tussenbroek, and in 1896 the social activist and writer H  l  ne Mercier.

Despite the tacit agreement that women had no place in science, they sometimes participated in the prize contests anyway, which, because of the review procedure set up to guarantee anonymity, was obviously a possibility. In 1763, the prize question on moral education in the HMW received an entry by Anna van der Horst, a poet from Enkhuizen, who can be described as a proto-feminist, since she argued for women's right to education all her life. She felt that women deserved a larger place in public life and it is therefore not surprising that she decided to take part in the male world of science. The reviewers - unaware of the names of the contestants - were clearly in no position to voice an opinion on this, although it is known that when Van der Horst published a pamphlet intervening in a theological debate, this led to a storm of protest.³¹⁵ Another female entry came in 1810, by the Swiss A.W. de Saussure, answering a question about the difference between the sublime and the beautiful. These examples are highly exceptional, however, and the true breakthrough for female scientists can only be located in the twentieth century.

³¹³ UA, PUG, inv. nr. 74. Yearly assembly of 1893.

³¹⁴ UA, PUG, inv. nr. 72. Yearly assembly of 1870.

³¹⁵ See her entry in *Digitaal Vrouwenlexicon van Nederland*:
<http://resources.huygens.knaw.nl/vrouwenlexicon/lemmata/data/Horst>.

4.5 Conclusion

From this discussion of the primary sources, it has become clear that – as previous historians have already noted – the HMW experienced a shift from useful science with a broad conception of what falls under science to a more narrow understanding of the exact sciences as the true science, unlike the PUG.³¹⁶ Also, rather than finding solutions for Dutch problems, the HMW become more interested in integrating itself into the international world of natural scientists, as signalled by the founding of the magazine *Archives Néerlandaises*, a magazine with the purpose of communicating the results of Dutch research to an international community of scholars.³¹⁷ At one point the HMW had truly been a catch-all society: the 1789 question evaluating Kant’s discussion of proofs for God’s existence was followed in 1790 by a question requiring an improved design for the water wheels of mills. The early HMW easily switched between highly philosophical and theoretical discussions and the most mundane, technical questions. The scientific ideal of usefulness managed to hang on into the first quarter of the nineteenth century, but virtually disappeared after that. Where the PUG had a broad membership of scholars related to the Utrecht University, which created a lot of discussion, and consequently did not allow for one scientific vision to dominate proceedings, the HMW was governed by a smaller group of scientists who focussed more on pure science. Occasionally a practical application would be required, but usually the expansion of knowledge about the basic processes of nature was a goal in and of itself. If the humanist ideal of keeping the classical culture and languages alive was still privately respected by some of the members, they did not express their ideas at the HMW, which everybody could see was not a place that was open to it anyway. In this way, the concentration upon the natural sciences became something of a self-reinforcing process: if the society became known as an exclusively natural scientific society, scholars who did not share that vision of science would be less likely to become members and instead try to gain entrance to a society like the PUG, where the classics were still an honoured part of science.

³¹⁶ Dick Schenkeveld, “De Hollandsche Maatschappij der Wetenschappen te Haarlem”, in: Aerts (ed.), *Geleerden en leken*, 9-16; Bert Theunissen, “Wetenschapsbeelden en de Hollandsche Maatschappij”, in: *Ibidem*, 35.

³¹⁷ Klaas van Berkel, “De Hollandsche Maatschappij, de Archives Néerlandaises en de Nederlandse natuurwetenschap rond 1870”, in: Aerts, *Geleerden en leken*, 59-81.

Conclusion – Scientific societies between the Republic of Letters and the university

During the heyday of humanism in Europe, the Dutch universities had been among the most prestigious of the world. Like their European counterparts, however, they would sink to a very low level in the seventeenth and eighteenth century, at least from a research perspective. Universities were no more than training grounds for a small group of professions. During the nineteenth century the university would once more become an important institutional space, taking the place of the scientific societies, whose importance dwindled somewhat later in the Netherlands than elsewhere in Europe, perhaps.

The reorganization of higher education in 1815 – with the *Organiek Besluit* – showed that the ideal of broad education was still shared by policymakers: theology and law students were supposed to show competence in mathematics, while medical students took courses in all the major natural sciences as well as in Greek, Latin, and rhetoric.³¹⁸ However, developments in higher education also reflected the fact that the scientific community in societies and universities turned their back on technical specialists to some extent. The introduction of polytechnic schools after the new reforms of 1863 indicates the extent to which technical expertise had become separated from the scientific world.

With the resurgence of the university in the nineteenth century came discussions about the best education: should a broad basis still be made obligatory for every student? Or should students just focus on the knowledge of their specific discipline. This last vision eventually won out. Even professors of Greek and Latin – who generally believed strongly in a broad education – became less responsible for conveying a general education, and became primarily “responsible for a body of field-specific knowledge”.³¹⁹ They did so, less out of conviction, but because of institutional pressures: universities more and more expected quality research and hired accordingly. Therefore, those who still believed in Latin as a general programme of cultural education and character formation, were more or less forced to adopt the new approach where the classics were a field just like any other in which detailed research was more important than broad education. During the second half of the nineteenth century, the large number of new chairs created at the universities was far larger than the amount in the twentieth centuries. In many ways, these decades were some of the most dynamic and

³¹⁸ Klaas van Berkel, A. van Helden and L.C. Palm, *A History of Science in the Netherlands: Survey, Themes, and Reference* (Leiden: Brill, 1999), 101. See for more on this also Pieter Boekholt, “Classical or Modern? University-Preparatory Education”, in: *Ibidem*, 279-310.

³¹⁹ James Turner, *Philology*, 277.

innovative ones in the entire history of the university.³²⁰ The creation of chairs for new disciplines, or parts of these disciplines led to a large increase in the number of professors, although it the number of students would only increase significantly in the twentieth century.

In conclusion, then, it has hopefully become clear that scientific societies deserve more attention than they have received up to this point, especially because more research is needed on the fascinating ways in which different visions of science interacted in these societies. The history of science is not a linear process in which one vision is neatly superseded by another, but exists out of different institutional episodes in which different visions interact and clash. In the societies, some scholars believed first and foremost in a broad and classical education which would form a well-rounded and erudite character, whereas many other society members thought this unpardonably self-centred and elitist, for in their view, knowledge should be employed for the economic, social, and moral improvement of the nation. Yet others emphasized the need for science to become the prerogative of a smaller group of professionals who knew what they were talking about, in contrast with the many half-learned amateurs who could enter the prize contests because of the way they were designed. Through the jury reports we get a clear view on the way these visions interacted in the HMW, where the three visions were equally present in the early society, but where the professional view eventually won out in the nineteenth century. It is this view which comes closest to the present-day view of science, but this does not mean that the PUG, in its continued adherence to not just the professional but also the classical view, is an outdated or uninteresting society. As Marc Fumaroli has recently argued:

L’oiseau de Minerve, a écrit Hegel, se lève à la tombée de la nuit. Disons, plus prosaïquement, que la fin de la croyance en un progrès linéaire et irrésistible nous rend plus indulgents pour des états du savoir et pour des formes de sagesse que l’histoire positiviste avait crus définitivement ‘dépassés’ par l’irrésistible progrès de la raison.³²¹

It is an anachronistic approach to obscure those elements in the society that seem alien or outdated to us and put the emphasis on the scientists and developments that we consider to be ‘modern’. To be sure, the surge in societies in the eighteenth century was inspired by a new ideal of citizenship but at the same time, there is a large measure of continuity in the shape and ideals of the societies in their (unconscious?) adaption of many elements of the culture of the Rhetoricians: “The eighteenth-century *genootschappen* and the chambers of rhetoric

³²⁰ See for these, and many other, statistics on the university in the nineteenth century G. Jensma and H. de Vries, *Veranderingen in het hoger onderwijs in Nederland tussen 1815 en 1940* (Hilversum: Verloren, 1997). For the facts cited here, see p. 17-8 and 38-9.

³²¹ Fumaroli, *La République des Lettres*, 67,

shared a vigorous pedagogical and didactic ambition, civilized male conviviality, and the love of competition and prize-contests.”³²² If we stress the way modern science has emerged from the nineteenth century societies, we should also emphasize how the early societies themselves were to some extent modelled on the template of late medieval and early modern groups and we should not ignore the extent to which these three different visions of science which we associate with very different ages, were present simultaneously in the societies.

The sources I have employed here give ample opportunity for further research. The fact that the HMW kept a lot of the rejected essays means that a historian interested in, for example, educational ideas around 1800, can use the entries on the pedagogical questions. The early reception of Lavoisier’s chemical system is another topic that cannot properly be studied without using the many questions posed on that theme. And for those historians working on the history of museums: the PUG archives contain a lot of information about the museum of antiquities sponsored by the PUG. The yearly reports of the general always include a detailed report on the acquisitions, for example.

Finally, research into some of the key figures in the PUG and HMW, their relations to each other, the government, and the university, can shed more light on the institutional and pragmatic as well as the ideological reasons behind the different developments sketched here. Because of the nature of the sources and time constraints, I have mainly focused on the world of ideas, and the arguments put forward for certain conceptions of science, but we also need more research into local circumstances, because these determined developments as well. Take for example the *Zeeuwsche Maatschappij* which developed into a society focused exclusively on (local) antiquities and literature. This can be explained by strong regional allegiance of the members and the fact that there was no major university nearby, so there were no direct links between society members and the larger scientific world. Changes in that world therefore were reflected in the *Zeeuwsche Maatschappij* with a major delay, if at all. The PUG, in contrast, was closely linked with a major university and consequently experienced a lot of debate between the professors who were members of the society and had different ideas about the course science should take. This is an important factor in explaining the broad profile that the PUG kept throughout the nineteenth century: there was no one in a position of such power that he could steer the society in one particular direction as was the case in the HMW, where the directors were not very well versed in science, and accepted the suggestions of the directors. These links should be explored further.

³²² Van Dixhoorn, “Chambers of Rhetoric”, 156.

To summarize, then, the institute of the prize questions was a great one in the context of a public science which engaged the public in finding solutions for problems everyone could recognize in their daily environment. Questions of this type could therefore expect a healthy number of entries and spark some debate. When the same instrument was applied to increasingly complex natural sciences, however, it turned out that the problem with the prize questions was that the people most qualified to answer them, were usually the members of the jury who had to review entries by the well-intended but under-qualified. It became more and more obvious that the prize questions were not the most efficient way to practice science, although the prize questions survived until 1900 and did occasionally result in an entry of interest. This development also explains the fact that during the nineteenth century, an increasing number of members wanted to abolish the prize questions, because the rare gems that were received did not outweigh the many futile efforts spent in reviewing the many insufficient entries.

All in all, the emergence of strongly individual disciplines in which boundaries were guarded carefully by the end of the nineteenth century was not inevitable: to some extent, 'information overload' had been a problem that Renaissance scholars also faced. They simply chose to cope differently, through elaborate systems of note-taking and impressive feats of memory. Disciplinary segregation is another way to deal with the fact that no one can possibly know everything, but it is a solution that also means that the concept of the unity of knowledge now has largely lost its meaning. Whether that has to be deplored or not is an open question, and whether it is even possible to restore some of the connections that have been lost through the re-emergence of interdisciplinarity, remains to be seen.

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