

In splendid isolation

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In splendid isolation

A history of the Willie Commelin Scholten
Phytopathology Laboratory 1894-1992

Patricia E. Faasse

Translated from the Dutch by Beverley Jackson

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Phytopathology Laboratory.

Contents

| | |
|----------|---|
| Prologue | i |
| 1 | WHAT DID WILLIE WANT? 7 |
| | Bulb trade and bulb-growing: Ernst Krelage 16 |
| | Research on plant diseases: Hugo de Vries 20 |
| 2 | PHYTOPATHOLOGY: A PRIVATE OR A PUBLIC INSTITUTE? 29 |
| | A private initiative 30 |
| | A service for agriculturalists 41 |
| | Trojan horse 45 |
| | A public concern 52 |
| | Two phytopathology institutes 58 |
| 3 | THE LADY FROM ROEMER VISSCHERSTRAAT 63 |
| | A new direction 67 |
| | Fungus lady 73 |
| | Prospects of a professorship 81 |
| 4 | 'OUT IN BAARN' 95 |
| | Diseased elms 98 |
| | In splendid isolation 102 |
| | 'Some gnashing of teeth on both sides' 108 |
| | Professor in Amsterdam 120 |
| 5 | STURM UND DRANG 123 |
| | The growth of phytopathology 128 |
| | Disease as a process 130 |
| | Elm disease 134 |

| | |
|--|-----|
| Poplar canker | 138 |
| Antagonism research | 140 |
| The Phytopathology Laboratory in wartime | 143 |
| | |
| 6 'TOIL AND MOIL' | 159 |
| Science of dynamic equilibrium | 163 |
| The demands of education and research | 169 |
| Fundamental research | 173 |
| A changing world | 190 |
| | |
| 7 TRIANGULAR RELATIONS | 195 |
| Having your cake and eating it... and eating it again! | 197 |
| Ecologically-oriented phytopathological research | 203 |
| Physiologically-oriented phytopathological research | 215 |
| Virologically-oriented phytopathological research | 221 |
| | |
| 8 CHARITY BEGINS AT HOME | 233 |
| 'Can those things fly?' | 235 |
| Mutually enhancing effects | 241 |
| Up against the wall | 248 |
| 'Too much' | 250 |
| A final word | 254 |
| | |
| Epilogue | 257 |
| Acknowledgements | 269 |
| Table of terms and abbreviations | 273 |
| Bibliography | 277 |
| Appendix | 285 |
| Index | 291 |

Prologue

Seven Women and a Diseased Elm

May 1995. The harsh whining of chain saws pierces the air of the sleepy neighbourhood. The Parks and Public Gardens Department has started work bright and early and two men are sawing down a twenty-metre high elm in an enclosed garden in the western district of Amsterdam. Hanging from ropes like mountaineers, the men slice off the tree's branches one by one, each time with a single sweep of the saw. The lopped branches swish down to the ground below. A few hours later, the colossus has been reduced to a pathetic stump. The houses on the other side of the square suddenly seem a few metres closer.

A furious resident phones the local authority. The elm was diseased, the official explains amicably, and there is no cure for elm disease. Only by chopping the tree down and removing it can you prevent the disease spreading or – more important still in a dense residential neighbourhood – make sure that the tree will not come thundering down of its own accord, toppled by strong winds.

Local residents had not even noticed anything wrong with the tree. How you can tell that an elm is diseased actually? 'It's an insidious process', explains Doekle Elgersma, plant pathologist at the University of Amsterdam. The first symptoms appear in the spring. The leaves on the youngest twigs wither and become discoloured, as if autumn has already come. Then they die. Some fall to the ground, and others stay hanging in the tree like little dead flags. Then, in the summer, bare patches appear in the full green crown of the tree. The patches are bigger the following year, and bigger still the year after, until the doomed tree is eventually completely bare. By then it won't take much to blow it down. The entire process of death can last as long as much as ten years.

Elgersma suddenly demands: 'Did you know that this disease is called 'Dutch elm disease' all over the world because the most important discoveries about elm disease were made by seven Dutch scientists? And that all seven were women?'

He shows me a bluish-green book. The title on the cover, in silver letters, is *Dutch Elm Disease: The Early Papers, Selected Works of Seven Dutch Women Phytopathologists*.¹ I leaf through it casually. There they all are, complete with photographs and nicknames. That conjures up a jovial atmosphere, as if they had been not just colleagues but also members of a sort of social club. Their dates strengthen this impression. The eldest, Barendina Spierenburg, was born in 1880 and died in 1967. Then came Johanna Westerdijk, born in 1883, died in 1961. The other five were at least fifteen years younger than these two, but were all within at most seven years of the same age. So they must have known each other.

I thank him and take the book home with me. Seven women, it sounds like an Old Testament prophecy; is it a coincidence?

In the summer of 2000 I received a telephone call from Bob Schippers. The Willie Commelin Scholten Phytopathology Laboratory had closed in 1991, and the Willie Commelin Scholten Foundation for Phytopathology was looking for someone to write a history of the Laboratory. Its closure had not signalled the end of Dutch phytopathology, Schippers hastened to explain – quite the contrary – but it *had* brought to an end the almost century-long existence of this Laboratory with the curious long name. My thoughts immediately flew to the bluish-green book.

Six of the seven women had worked at that Laboratory. I had never shaken off a certain curiosity about the connections between these women, the Willie Commelin Scholten Phytopathology Laboratory, and elm disease; this was a unique opportunity to find out the underlying story. Of course I would be happy to write that history, I replied.

I soon discovered that the bluish-green book on Dutch elm disease was not the only one to discuss the dominant role of women in the history of the Phytopathology Laboratory. Googling ‘Willie Commelin Scholten’ with the Dutch word for history took me straight to the home page of the *Jaarboek voor Vrouwengeschiedenis* (Yearbook of Women’s History), followed by the 1898 Nationale Tentoonstelling van Vrouwenarbeid (National Exhibition of Women’s Labour) and the local paper produced by the Society of the ‘Professors’ and Burgomasters’ Neighbourhood’, announcing the first woman professor of law in the Netherlands. These three links all appeared before the first one relating to phytopathology. So there was clearly some link between women and the history of the Phytopathology Laboratory, quite aside from elm disease.

¹ F.W. Holmes and H.M. Heybroek, *Dutch Elm Disease: The Early Papers, Selected Works of Seven Dutch Women Phytopathologists*, APS Press, 1990. F.W. Holmes was a visiting scientist at the Phytopathology Laboratory from 1970 to 1971.

The reason for this association, which at first sight seemed so odd, soon became clear. The Phytopathology Laboratory had been founded in 1894 with the private capital of Mr and Mrs Commelin Scholten of Amsterdam, to commemorate their son Willie, who had died at an early age. That explained the name. But when its first director, Jan Ritzema Bos, had left the Amsterdam Laboratory after eleven years to lead the newly established Institute of Phytopathology in Wageningen instead, Johanna Westerdijk, a woman of only 23 years of age, had been chosen to succeed him.

For decades after that, the Laboratory had a woman director. Westerdijk had not retired until 1952. Under her captaincy the Laboratory had grown from a small private establishment to an internationally renowned centre of phytopathology. In 1920 it moved from modest-sized premises in Amsterdam to the grand Villa Java in Baarn, where it remained until its closure.

Westerdijk was appointed extraordinary (that is, part-time) professor of phytopathology at Utrecht University in 1917, followed in 1930 by the same – simultaneous – appointment at the University of Amsterdam. A total of fifty-five students gained doctorates under her supervision, twenty-six of whom were women. The professorships, in particular, proved to be crucial in determining the Phytopathology Laboratory's image. All the websites I consulted noted that Westerdijk had been the first woman professor in the Netherlands, and that she therefore served as a rich source of inspiration for historians interested in the role of women in science.²

After Westerdijk's departure, one of her former PhD students, Louise Kerling, took over the directorship as well as both part-time professorships. She stayed at her post until 1970. Kerling added a new wing to the Laboratory as well as installing modern equipment and climate chambers, all of which opened up new avenues of research. Not until Kerling herself left was the era of women's dominance in Baarn finally at an end. And as far as these sources are concerned, that is the history of the Willie Commelin Scholten Phytopathology Laboratory in a nutshell. For the rest of the story, the interested outsider will have to consult other sources.³

² *Inter alia* M. Bosch, *Het geslacht van de wetenschap. Vrouwen en hoger onderwijs in Nederland 1878-1948*, Amsterdam, SUA, 1994.

³ One such publication being *Communication* 75 of the *MPLWCS* no.75, 1969; a jubilee issue written by Kerling to mark the Laboratory's 75th anniversary. Another, published in 1997, is a 'Historical Review' in the *European Journal of Plant Pathology*, in which former director Bob Schippers and the former chairman of the Willie Commelin Scholten Foundation for Phytopathology Ben Roosje discuss not only the history of the Phytopathology Laboratory, but also the future of the foundation; see L.C.P. Kerling, 'Phytopathologisch Laboratorium "Willie Commelin Scholten" 18 december 1894-18 december 1969', B. Schippers and G.S. Roosje, 'Hundred years of history and the future of the Foundation "Willie Commelin Scholten Phytopathology Laboratory"', *European Journal of Plant Pathology* 103, 1997, pp. 667-671.

The Laboratory's recent history proved to have been documented by its own staff. Their version of events is self-evidently coloured by their own interests. Interestingly, the present and future occupy at least as important a place in these writings as the past. Instead of an emphasis on the role of women we find a curt recapitulation of the most recent trends in the Laboratory's research, the international fame it reaped from them, and the way in which the research was organized.

The man who took over the directorship and both professorships after Kerling was Koen Verhoeff, who had gained his doctorate at Utrecht. He divided the scientists into three research teams, around the subjects 'Susceptibility and Resistance', 'Ecology of Pathogenic and Non-Pathogenic Micro-Organisms', and Virology. His successor Bob Schippers, who took over at the end of 1986, had been awarded his PhD by the University of Amsterdam. He changed the course of the existing research by actively seeking cooperative frameworks with molecular biologists working elsewhere. By then, the end of the Willie Commelin Scholten Phytopathology Laboratory was already in sight; but the research itself was in no such danger.

Soon after Schippers' arrival, the two remaining research teams were split up, one being transferred to the University of Amsterdam and the other to Utrecht University. The research once performed in Baarn was continued within the structure of the Department of Molecular Cell Biology and the Department of Plant Ecology and Evolutionary Biology, respectively. In the early 1990s the buildings and ground in Baarn were sold and vacated, and the Willie Commelin Scholten Phytopathology Laboratory ceased to exist.

I had visited the abandoned Villa Java in May 1995. A sumptuous building in colonial style, with high windows and elegant bay windows. It stood in a large garden enjoying the shade provided by numerous great trees and surrounded by muddy paths. The fire brigade had conducted a drill there and had left a smoke-blackened child's cot in the corner of a room. The air was heavy with the stench of burning. The basement was under several inches of water, and disused wires dangled from the ceiling. A few torn sheets from a sex magazine were scattered over the floor. In the attic I came across some books covered with a thick layer of dust: PhD theses, as it turned out.

Long after my visit, at the end of the 1990s, a demolition crew arrived. The caterpillar tracks of the mechanical scoops scored deep ruts in the garden around the Villa. Within a few weeks the entire complex had gone; little more remained of the Willie Commelin Scholten Phytopathology Laboratory than a budget, a large archive collection, and the Foundation's executive board.

I was well aware by then that the history of the Willie Commelin Scholten Phytopathology Laboratory could not be equated with the research on elm disease, although this was the Laboratory's chief claim to fame. That other success story – the predominance of outstanding women scientists – was also only part of the story.

Correcting these imbalances in perception became one of the objectives of this book. If the Laboratory did not derive its relevance solely from the sex of its scientists or its focus on diseased elms, what were the other important factors? Part of the answer lay in the terse (and to lay readers fairly inscrutable) writings of the Baarn phytopathologists themselves. Incorporating their own narratives into the existing history thus became my second objective.

In the summer of 2002, Nyckle Fokkema, the then chairman of the Willie Commelin Scholten Foundation for Phytopathology, parked outside my office in the western district of Amsterdam. In the back of his car were 22 cardboard boxes containing all the remaining written sources from the Laboratory. The boxes had been in storage at the administrative centre of Utrecht University for years. No one had ever sifted through them to classify them or even to draw up an inventory. Their content was largely unknown. We unloaded them and carried them into my office.

A few years earlier, the Foundation had set up a supervisory committee with which agreements had been made on the writing of the history of the Willie Commelin Scholten Phytopathology Laboratory. I would be able to draw freely on their collective memory. That a professional science historian, in other words a relative outsider, would write their history not only had their consent, it was their express wish.

And the archives – obviously a primary source of information – would be relocated to my office for as long as proved necessary. Now, they were finally here. As happy as a child on Christmas morning, I started to unpack the boxes.

I What did Willie want?

Caspar Willem Reinhard Commelin Scholten died on Friday, 30 June 1893, exactly one week before the end of the academic year. According to the record of his death in Amsterdam's municipal archives, he was, 'a *Philosophiae Naturalis Candidatus* [bachelor of natural philosophy] by occupation', and lived in Amsterdam. He was twenty-five years old. Yet Amsterdam's archives reveal nothing about the cause of death, so that the inquiry moves to Apeldoorn, the city where he died.

In the card-index boxes of Apeldoorn's municipal archives, there is no mention of a 'Commelin', 'Scholten', or any combination of the two. In the microfiche death records, however, his name does appear. The record of Willie's death has been written in a flamboyant hand. Two witnesses had stated to the official of Apeldoorn's Registry of Births, Marriages and Deaths that Willie had died 'at 2 p.m.... in the home of Dr. Pierre François Spaink in this municipality'. *Erica*, the address-book and yearbook of the municipality of Apeldoorn, carries a listing in 1893 for 'Spaink ... physician, medical director of the sanatorium for the mentally ill, on Loolaan.'

In the annals of *Erica*, the name of Spaink, with this description, first occurs in 1892. According to the volume published in 1963, the last one in the archives, Bosrust private sanatorium for the mentally ill was located at Loolaan 59. Its medical director, Spaink, had moved to Utrecht with his family in 1909.

Apeldoorn's municipal archives contain a large collection of historical photographs and postcards. In one of the blue files with old photographic material is a postcard with a view of a magnificent villa: the caption tells us that this was Bosrust Sanatorium on Loolaan, Apeldoorn. The institution appears to be in the middle of a wood, but this is an illusion. Loolaan is an avenue lined with a wide row of trees. 'Huize Boschrust', to give the villa its old name, is set back at some distance from the Loolaan. It is a capacious building, with a circular tower beneath a pointed roof serving as watchtower. It has numerous large windows, including generous-sized, high, bay windows.

The building is entirely in tune with its surroundings. A little further down the road stands the school that was attended by the children of the royal

household, next to which is a café-restaurant. All the buildings are separated by large gardens and trees, so that each one is framed in its own dignified surroundings. Loolaan broadens out into a park at one end; this is where the drive leading to Het Loo Royal Palace begins. A small electric tram turns in a little circle there and trundles back where it came from. The whole avenue exudes an atmosphere of the elegant, wealthy establishment. So this was where Willie died.

He had committed suicide, it was whispered years later. But that can no longer be proved. Willie's parents placed a death notice in the daily newspaper the *Algemeen Handelsblad* on 4 July: 'Died 30 June 1893, in Apeldoorn, our only child, Mr C.W.R. Commelin Scholten, Bachelor of Natural Philosophy at the University of Amsterdam.' That same day they buried their son at the General and Roman Catholic Cemetery, Heemstede.

Who was Willie? What would he have wanted to do with his life? He came from an upper-crust background – a Christmas child, he was born in Amsterdam on 25 December 1867. Both his father, Caspar Willem Reinhard Scholten (knight in the Order of the Dutch Lion), who was almost fifty-four years of age when his son died, and his mother, Hendrina Hermina Commelin, who had just celebrated her fiftieth birthday, came from prominent local families. The coat of arms borne by the Scholtens, a patrician family, invokes a tradition of trade and regentships reaching back for centuries.¹ Among Hendrina's forebears were several famous printers, a historian of the city of Amsterdam, and two professors of herbology at the Athenaeum Illustre, the precursor of the University of Amsterdam. Commelinstraat in the eastern district of Amsterdam is named after one of them.

Father Scholten – with his long sideburns and high forehead an archetypal late nineteenth-century aristocrat – was an ambitious businessman.² He started his career in a managerial position within a traditional Amsterdam sailing ship navigation company, but he soon found his feet as a forward-looking executive. Suriname could become the Netherlands' second Java, he predicted: provided that overseas trade was driven not by the wind but by men and machines. Ocean liners had everything that the fragile sailing ships lacked: indestructible, they held unswervingly to their course, and their size almost defied the imagination. Furthermore, you could rely on them, which could certainly not be said of the sailing ships, with their vulnerability to

¹ See also *Nederlands Patriciaat* 48, 1962, p. 321, p. 333.

² All the details concerning the founding and history of the Royal West Indian Mail Service (Koninklijke West-Indische Maildienst) derive from GAA, persverzameling Hartkamp, box 68.

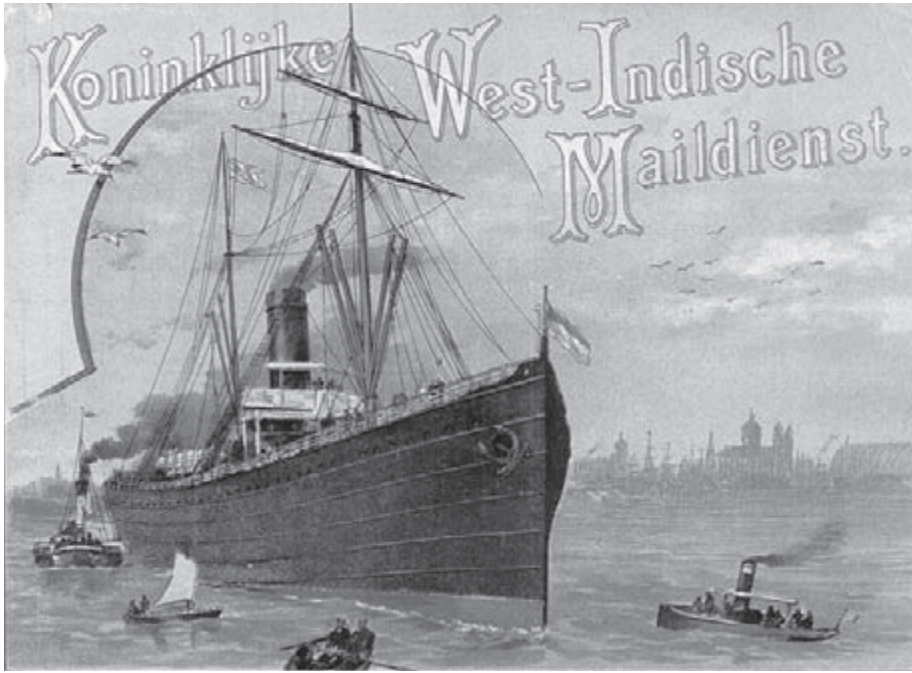
wind and current, which constituted the majority of vessels rolling in the seas of the world. To build three iron steamships in the Netherlands, each weighing over 1,000 tons, and to equip them for passengers along the lines of French ships, he calculated that 1.2 million guilders would be needed in starting capital, an investment that would soon repay itself many times over.

On Thursday and Friday, 25-26 May 1882, four prominent and eminently reliable citizens opened subscriptions for 1,200 shares of 1,000 guilders each (each one divisible into subshares of 500) for the launch of the West Indian Mail Service, the first Dutch steamship navigation company that would run a regular service to and from the West Indies. King William III looked favourably on the plan and warmly commended the investment to his wealthy friends. The government also agreed to support the enterprise, and announced that it would use the new service to transport mail, goods, and colonial officials. Two years (and a minor change of name) later, Scholten and his co-director George, Baron Tindal – who was also chamberlain to King William III and a member of the supervisory board of ‘Nederland’ Steam Navigation Company – proudly presided over the launch of the Royal West Indian Mail Service.

On 28 March 1884, they watched as their first ship, the Oranje-Nassau, cast off and majestically drew away from the jetty of De Ruyterkade, Amsterdam. Cutting right through the drone of the machines in the ship’s belly and the crowds’ loud cheers, the little orchestra stolidly struck up first the national anthem *Wien Neerlands Bloed* and then *Directlijn Marsch*, a piece composed especially for the occasion. According to a reporter for the monthly magazine *Eigen Haard*, the ship was accompanied by ‘merry dancing crowds’ all the way to the port of IJmuiden, where a glorious glitter of nocturnal fireworks lit the sky as it steamed into the open sea, towards Suriname, Trinidad, Curaçao, Porto-Bello, and LaGuayra.

That same year, three steamships of the new line initiated and maintained a highly successful monthly service between the Netherlands and the West Indies. On the outward journey, the fleet carried butter, cheese, Dutch gin, and potatoes, as well as colonial officials; on the return journey the hold was filled with cocoa, sugar, and bananas. From then on, father Scholten rubbed shoulders with the cream of society, and rejoiced in the warm personal interest of the king. In May 1909, sixteen years after his son’s death, he retired as director at seventy years of age.

Although his wife, Hendrina, had no official occupation, she possessed no less vigour and zest for innovation than her husband. She dedicated herself to setting up courses in cooking and domestic science at the local girls’ school, and founded the women’s museum of reading on Vondelstraat. Later historians labelled her a feminist – although she certainly did not count herself among



Cover of a leaflet on the Royal West Indian Mail Service. Amsterdam Municipal Archives.

the feminists whose cause was championed so vociferously by her neighbour, the famous Aletta Jacobs.

Hendrina, like her son, had been raised an only child; her brother had died shortly after birth, when she was only two years old.³ As if to emphasize the importance of his existence, Willie bore the last names of both his parents, besides all three first names of his father.

There is a painting in Utrecht University Museum, depicting mother and son in the style of the Hague School. Dreamily romantic, their two heads at the same height, they gaze at the viewer. She is seated, in a pink dress, her black hair tied back in a bun; while her son, still a small boy, stands beside her, his arms around his mother's neck. He is bare-kneed, and wears knee-length socks. When the portrait was made, and by whom, is unknown; but regardless of the date, it reflects the tragedy of the young man's sudden death in 1893.

³ For the genealogy of the Commelin family, see *De Nederlandsche Leeuw*, 1923, pp. 152-157; *De Nederlandsche Leeuw*, 1942, pp. 33-35; *De Nederlandsche Leeuw*, 1958, p. 514.



Willie and his mother. Universiteitsmuseum, Utrecht University Museum.

Willie studied biology at the University of Amsterdam. He had enrolled in the university's fraternity on 21 October 1886, less than two weeks after Frits Went had been awarded his PhD in the same faculty, with Hugo de Vries as supervising professor. These are the two men whose views would determine the destiny of the Willie Commelin Scholten Phytopathology Laboratory for almost half a century.

He was 19 years old at the time – according to a photograph dating from this period a well-groomed, handsome young man, with a white collar and a tie, a small flaxen moustache, full lips, and short sideburns. His hair gleams with pomade and is combed back in a tight parting, his eyes gazing just past the lens into the distance. He was a good, sincere, and modest young man, his parents said after his death. The photograph and the portrait in the University Museum are the only images of Willie that have been handed down to us.

From 1886 onwards, Amsterdam's student almanac lists his name faithfully every year in the list of fraternity members: 'Scholten (C.W.R. Commelin), Tesselschadestraat 9.'⁴ In other words, he continued to live with his parents, in one of the superb mansions overlooking the Vondelpark. In the lovely back garden on the corner of Tesselschadestraat and Roemer Visscherstraat, father Scholten, who owned buildings on both streets, had had a simple laboratory built for his son. A conservatory followed later on, which became one of Mrs Scholten's favourite retreats. The garden was the epitome of good taste and refined architecture.

Willie was a sixth-year student when his name was mentioned for the first and only time in the letters of his mentor, Hugo de Vries. 'My private seminars are poorly attended', De Vries wrote to his former student Went on 16 February 1892. 'Verschaffelt (the most attentive) has gone, Willy Scholten has broken his leg in a riding accident, De Meijere has taken his Master's examinations. Now there is only Krelage, who is no longer a student, but who always comes in all the way from Haarlem, Goethart (did I already mention that he has passed his MO [secondary school teaching certificate], in The Hague?), Miss Lourens, who is studying for an MO, and two Groningen students, Hartkamp and Versluys.'⁵

For the rest, all that remains of him is a lecture notebook with a few pages of writing. It was discovered in the archives of the Willie Commelin Scholten Foundation for Phytopathology, in a brown folder among a pile of letters and extracts of the deed of foundation. The year in which it was written is uncertain, and we cannot even be sure that it was Willie's, though this seems likely,

⁴ *Almanak van het Amsterdamsch Studentencorps*, 'Naamlijst der leden van het Amsterdamsch Studenten Corps', uva.

⁵ Archives of Hugo de Vries, MB, Leiden.



Caspar Willem Reinhard Commelin Scholten Jr. Archives of the wcs, Haarlem.

given the handwriting and the place where it was found. The content suggests that it may be the notebook that Willie used just over a year before his death, during Hugo de Vries's private seminars.

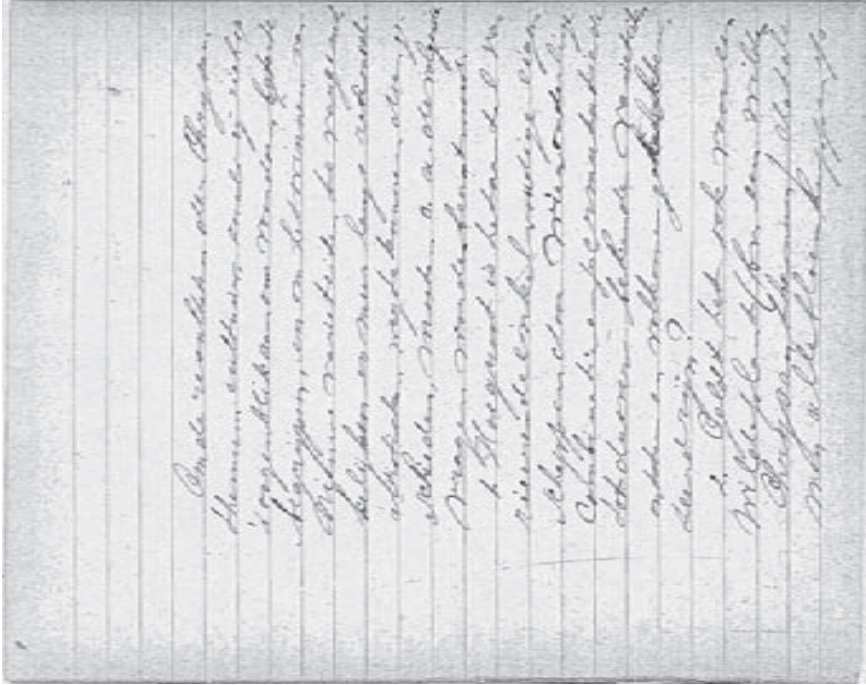
The first page reads: 'To gain a better understanding of the results of chrysanthemum cultivation as practiced today, and to make it easier to develop new varieties and to ensure that this process is channelled along more rational and artistic lines, the following questions must be answered, among others.' Fourteen questions and program points follow. Question 9: In which part of the plant is the flower's colour determined? Program point 14: 'It seems to me that in general the varieties of the chrysanthemum, like those of the rose, are *not* merely fashion products, but possess artistic significance of enduring value, and that they can be equated in all the most salient respects to inanimate objects – contrary to what H. de Vries maintains. Art experts at home and abroad should be consulted on this subject.'

If this was Willie's notebook, it reveals his passion for chrysanthemums. 'What was, or were, the original species?' He answers the question himself: 'The best way to find out would be by taking a trip to Japan.' Is too much manure damaging? Krelage and De Vries have proved that it is not. Poor cultivation makes flowers smaller. Does the good cultivation of varieties developed to produce the largest blooms make their blooms even larger, or is the size influenced only by the choice of sowing varieties? How do the most beautiful and the largest flowers come about?

Fundamental botanical research into the laws of heredity, as taught and conducted by De Vries, provided the foundations for the knowledge that Willie pursued. In his notebook he wrote, meticulously: 'How large is the number of variable single properties whose mutual combinations and permutations have produced and completely defined the varieties that have become known up to the present day?' Question 5: 'Is an excess of fertilizers such as zinc and iron absorbed or does the plant adhere to the normal maximum absorption?' Had Willie pursued and found the answers to these questions, he would at the very least have become a successful chrysanthemum grower – but he might equally have become a great connoisseur of art or a famous geneticist.⁶

The observations in this little notebook have never been mentioned before. Accounts of the origins of the Willie Commelin Scholten Phytopathology Laboratory generally say merely that Willie was interested in plant diseases, and that his parents therefore decided to establish a phytopathology laboratory after his death. But why phytopathology, actually, and not something else?

⁶ Did Willie's special love of chrysanthemums somehow presage the rage for the genus in art? The Dutch artist Pieter Mondrian earned his living from 1900 to 1920 by making an estimated 200 portraits of chrysanthemums, in the form of drawings, watercolors and paintings.



Handwriting of Willem Commelin Scholten, c. 1892. Archives of the wcs, Haarlem.

The oldest letter in the archives is dated 12 August 1893 – over a month after Willie’s funeral. ‘The large number of condolence letters we have received in response to the painful loss we have suffered with the death of our only son makes it impossible to answer them all separately’, is the text printed within the heavy black mourning border. And written underneath, in wispy italics: ‘Your letter gave us immense pleasure, because it showed so clearly that you learned to value our dear son for all his goodness and sincerity, qualities that were not always noticed because of his modesty. We seek our consolation here in the tranquillity of nature and expect to remain here until 3 September. Should you come to Amsterdam at some point after that, we would be highly gratified if you would pay us a visit. In our loneliness, it would be a blessing to speak again about our dear child, with someone for whom we know he felt great love and friendship.’ The letter was addressed to Mr Ernst H. Krelage, Haarlem.

Ernst Krelage was Willie’s friend. They were a little over a year apart in age, and both had attended Hugo de Vries’s private seminars. They had met as members of the mathematics and physics debating society *Naturae Exordia Vera Tradidit Omnibus Newton* and the history debating society *Clio Luce Investigamus Obscura*.⁷ Both were without siblings, and neither completed their studies; but there the comparisons end.

Ernst was the only son of the Haarlem bulb-grower Jacob Heinrich Krelage, a corpulent man with thick grey hair, a firm chin, and a resolute gaze. Ernst had started working in his father’s business at 20 years of age. He continued to attend De Vries’s lectures intermittently as an auditor, but did not take examinations. When the old Krelage died in 1901, Ernst followed in his footsteps, as his father had done after his own father’s death.

Flower bulbs had been among the Netherlands’ main trading products for centuries. At key moments, Jacob Heinrich loved to expound on how deeply the bulb trade was entrenched in the national consciousness. A discussion arose in the press at some point concerning the choice of a national flower, and Jacob was the first to insist on the tulip. His efforts were in vain, he was forced to acknowledge, disconsolately: ‘Flowers and songs have little appeal to our nation’s heart.’⁸

⁷ ‘Newton’ (‘Newton gave us all the true principles of nature’) and Clio (‘we explore the mysteries with Clio as light’) were popular debating clubs. Krelage family archives, admission code 29-13, inv. no. 122: diplomas etc. from Commelin Scholten’s student days are from GAH.

⁸ Character sketch of J.H. Krelage in *De Hollandsche Revue* II, ed. F. Netscher, 1897, vol. 2, no. 11, November 1897, p. 1.

It was the specific succession of peat and sand that made the soil between the dunes and the polder, between Haarlem and Leiden, ideal for bulb-growing. There, ‘where the eternal murmur of the North Sea is heard’,⁹ a unique culture had evolved in the course of time, with its own laws and customs, its own rules and unwritten codes of conduct. In the latter half of the nineteenth century, bulb-growers had finally shaken off for good the terrible memories of tulip mania – ‘when those charming flowers were degraded to the playing dice of a besotted population’,¹⁰ as Jacob Krelage put it. The bulb business was in the throes of a spectacular leap forwards. The bulb fields expanded from 300 hectares in 1860 to 600 hectares in 1880; and subsequently to 2500 hectares in 1900. Bulb exports, which had brought in only a million guilders in 1860, yielded three and a half million in 1890 and seven and a half million around the turn of the century.¹¹ While the agriculture sector was languishing under the collapse of grain prices, the bulb fields flowered every spring in all the colours of the rainbow. It was a kingdom unto itself – and in that realm of bulbs, Jacob Heinrich Krelage was king.

Jacob’s father, the first Ernst Krelage, had arrived there around 1800 as an 18-year-old, penniless farmer’s son from Hanover, and had built up a prosperous life there. He had begun humbly, as a labourer doing the simplest farm work. He helped to dig channels, cleaned the sides of ditches, and mowed the grass. As time went on, he applied himself to bulb-growing. Unlike most of his contemporaries, however, he did not focus on cultivating particularly beautiful flowers for the wealthy elite, but on growing bulbs of an average standard, which were affordable for the fast-expanding middle classes. His horticulture business, founded in 1811, steadily expanded, mainly because Ernst took pleasure in developing new hyacinth varieties using cross-pollination and selection and offering them for sale at the flower exchange in Frankfurt am Main. By 1829, over 300 new varieties had been created using home-grown seed – not by the flowers and the bees, but by Ernst Krelage and his practiced eye. In 1850, Krelage was able to make his only child, Jacob Heinrich, co-proprietor of the firm that would henceforth be known as Ernst Heinrich Krelage & Son.

Jacob Heinrich, who was then 26 years old, also took the bulb business very seriously. By then Haarlem had become the heart of a bulb-growing region that stretched in a long band behind the dunes, parallel to the coast, from the

⁹ Ibid, p. 5.

¹⁰ E.H. Krelage (ed.), *Gedenkeboek ter herinnering aan het 50-jarig bestaan der Algemeene Vereeniging voor Bloembollencultuur te Haarlem 1860-1910*, Haarlem, Van de Erven Loosjes, 1910, p. 1.

¹¹ E.H. Krelage (ed.), *Gedenkeboek ter herinnering aan het 50-jarig bestaan der Algemeene Vereeniging voor Bloembollencultuur te Haarlem 1860-1910*, Haarlem, Van de Erven Loosjes, 1910, Appendices.

northern to the southern Netherlands, and Jacob resolved to persuade the bulb-growers to join forces in a single organization. He succeeded in 1860, with the founding of the General Bulbgrowers' Association in Haarlem, although two of the elite bulb-growers' societies, 'The Bloom of Kennemerland' and 'The Flora of Noordwijk', declined to join. The Association grew in esteem with the appointment of several honorary members from the Royal House. Jacob Krelage himself naturally became President, remaining at his post for almost forty years.

The Association robustly championed the interests of the bulb-growing industry, 'which provides bread and even prosperity for many, besides fostering the love of ... bulb-growing itself', in Jacob's words.¹² The primary objective was to mount an exhibition every five years, at which the most beautiful flowers would be crowned. Meanwhile, however, other matters also claimed its attention. Water levels, for instance. From 1872 onwards, the bulb-growers collectively bombarded the dyke reeve and polder board of the Rhineland with complaints about swamped bulb-fields. Seven years later they finally carried the day, winning a vote in decisions on the polder water level.

In 1874 the bulb-growers joined forces again, this time to do battle against rodents that were eating the leaves of bulbs in the dunes. They went on hunting expeditions that spring, decimating the populations of rabbits and hares – the Association's autumn assembly rang with applause. The following year, the executive committee wrote a bunch of angry letters to the government, asking it to urge the Italian government to scrap the ban on bulb imports, since the dreaded Colorado beetle only ate potatoes and not bulbs. In any case, the vermin would never thrive in the Netherlands' wet climate – or so it was believed. Not until 1888 did Italy decide to allow free imports again.

In 1879 the growers were busy promoting research into a mysterious disease that posed a threat to hyacinth cultivation. Jacob Krelage had asked fellow-townsmen Hugo de Vries for advice, and De Vries rapidly performed some research in his own laboratory in Amsterdam, concluding that a bacterial infection might be to blame. Hearing this, the Association decided in 1883 to fund a long-term research project to be conducted by Jan Hendrik Wakker, one of De Vries's students, on the disease that was attacking hyacinths and other bulbs.¹³

¹² Ibid., p. 15.

¹³ See e.g. Hugo de Vries, *Knijsels en Herinneringen*, vol. III, October 1930, pp. 708-714, unpublished autobiography of De Vries, archives of Hugo de Vries, library of Anna's Hoeve Biology Centre, uva; E.H. Krelage, 'Het onderzoek der hyacinthenziekten, een episode uit het prae-phytopathologische tijdvak', *Tijdschrift over Plantenziekten*, 1940, pp. 30-45.

Jacob Heinrich Krelage loved science. On his death in 1901, his house in Haarlem was found to contain the largest horticulture library in the country. He had collected and studied everything that had been written about bulbs and their cultivation. Not a single periodical had escaped his attention. As the years went by, he spent more time in his study than in the fields, but his business flourished as none other.

Even so, in 1885, when Wakker had been researching bulb diseases for three years, Krelage conceded that the findings were too meagre to be applied in practice. The young man's work was scientifically impeccable, but it elicited a disgruntled response from the Association's membership. What was the point of identifying the precise organism that was causing the slimy hyacinth disease? What was the point of learning all about its life cycle, if the findings did not point to a way of destroying it? All this research was just costing money; it might well bankrupt the Association.

Wakker acknowledged the problem. But the majority of plant diseases are caused by creatures that intrude into the body of the plant, he reported in the last of his reports. Once they have embarked on their destructive work within the plant, they cannot be reached, and 'the popular remedies that are used to powder the leaves, add to the soil, or spray into the air can no longer help.'¹⁴ The only thing that might work in the battle against plant disease, perhaps, was some preventive remedy, but would the development of such a remedy justify the necessary time and expense? And would it meet expectations?

'What should we envisage as the practical goal of the research into a plant disease?'¹⁵ Was it the survival of an individual, as in human pathology, or the survival of a species, or of a variety? It was a rhetorical question: anyone would surely concede that ultimately, what really mattered was preserving the species. And what remedies could help the species or variety to fight off the parasite? You had to choose: you could either try to exterminate the parasite, or gamble on procedures that would make the plant as strong as possible, including tried and tested formulas for a good harvest such as efficient fertilization, the effective selection of seeds, crop rotation, ensuring adequate soil drainage, efficient irrigation, and so on.

That was precisely what Willie had been working on, Krelage explained. Not curing disease, but preventing it – better still: actually improving the bulb yield! What a fine objective this could be for a new foundation: to launch a laboratory for varieties to be used in bulb-growing. This was a field

¹⁴ J.H. Wakker, *Onderzoek der ziekten van hyacinthen en andere bol- en knolgewassen gedurende de jaren 1883, 1884, en 1885*. Haarlem, Algemeene Vereeniging voor Bloembollenkultuur, vol. III, p. 40.

¹⁵ Ibid.

of self-evident importance – or so it certainly appeared to Jacob and Ernst Krelage themselves. Of all the branches of horticulture in the Netherlands, bulb-growing was the largest, and what is more – as all would surely agree – it was also the most important, renowned, progressive and (inasmuch as one could say such a thing) the most scientific of its kind.

In his characteristically delicate handwriting, Ernst Krelage Junior quoted his friend Willie as having said: ‘It is a great pity that we know so little about the origins of most of the hybrids and varieties among our garden plants. It would be not only interesting but also instructive if we knew the entire genealogy of our Begonias, for instance; unfortunately, we know precious little about it. In general, we can say that there are very few rules involved in cross-pollination and that most of it is empirical.’¹⁶ Jacob Krelage and his son were in no doubt: what Willie would have wanted was to create a laboratory for varieties to be used in bulb-growing.

Research on plant diseases: Hugo de Vries

‘Yesterday evening we visited Professor Hugo de Vries, with whom we worked out the plans we had discussed with you. He endorsed your idea and is very willing to discuss this matter further ... If possible, he would consider it more appropriate if the plans could be implemented in the grounds behind the house. Since he is less well-informed, however, about the space that we possess there now, after last year’s expansion [i.e. the new conservatory], he plans to come and inspect the situation at 10 o’clock on Sunday morning. The Professor would be extremely pleased if you could be present on that occasion so that he may discuss certain matters with you.’¹⁷

It was the end of November 1893. The idea of founding a research institute dedicated to Willie’s memory had become a firm plan in his parents’ minds. It was time to get down to business.

A few days after the meeting, Hugo de Vries recorded his reactions to it. ‘Among the institutions that Krelage mentioned last Sunday as qualifying for consideration to implement your idea, should the creation of a laboratory for varieties in Heemstede prove impracticable, the most promising one seemed to me a laboratory for plant diseases.’¹⁸ So Krelage had proposed the idea of plant diseases, although he was not the only one to do so. But De Vries was thrilled.

¹⁶ Ernst Krelage to Scholten, 23 November 1893, archives of the wcs.

¹⁷ Scholten to Ernst Krelage, 22 November 1893, archives of the wcs.

¹⁸ Hugo de Vries to Scholten, 29 November 1893, archives of the wcs.



Hugo de Vries, c. 1895. Library of the Biology Centre, University of Amsterdam

‘I immediately saw the connection between this subject and the great passion with which your son tackled this subject too, at my laboratory. It was in the last winter that he worked with me.’ Willie had asked De Vries for some samples of diseased plants. De Vries had responded by writing to Jan Ritzema Bos at the National College of Agriculture in Wageningen, who helped to procure a generous consignment of parts of plants that had been attacked by disease. Willie had learned a great deal from studying them. ‘You will undoubtedly find the results of these studies among Willie’s notes.’

And he clarified his train of thought: ‘On further reflection, the idea of establishing a laboratory for plant pathology seems to me to be entirely true to the spirit of your son. He said on many an occasion that his passion was not the pursuit of pure science but the importance of scientific research to practical applications. And nowhere does botanical research yield such direct and such useful practical applications as in the field of plant pathology.’

Had Willie really expressed himself to this effect so frequently? Or was De Vries not primarily echoing his own doctrine here? De Vries continued: ‘Admittedly, Willy’s chrysanthemum studies were not directly related to the study of plant diseases but neither were they related to questions regarding the origins of varieties.’ This latter point was easy to prove, he said. ‘It is most obvious from his choice of this genus, and was also clear to me from the discussions we had on this subject. The production of varieties is based almost entirely on harvesting seeds and sowing them; in our part of the world, however, chrysanthemums do not produce any seeds, not even in greenhouses.’

Was De Vries familiar with the list of questions in Willie’s brown notebook? Question number 10 reads: ‘What is the easiest way to encourage chrysanthemums to produce seed in our climate? One could try the method that De Vries has used with other plants, that of leaving the cut flowers in carafes of water; the seeds tended to be quite small, but ripe and germinable nonetheless.’

In support of his proposal, De Vries wrote: ‘I am not putting this forward to challenge Krelage’s idea, which still has my warm support in spite of the difficulties involved, but merely because I am convinced that the idea of founding a laboratory of plant pathology would accord with your son’s spirit just as well.’

Hugo de Vries – tall and thin-faced, with piercing eyes and a scrawny beard – was a man with a mission. He was born in 1848, the year in which the Constitution put an end to the king’s authority, and the Netherlands’ system of government took its first cautious steps towards democratization. With the rumbling of European revolutions in the background, Hugo grew up in the imperturbable tranquillity of Haarlem.

Like Willie, he was born into a prominent family. His father, Gerrit, had studied law in Leiden and had set up business as a lawyer in Haarlem in 1840. When Hugo was two years old, his father became a member of Holland's provincial council, and he later joined the Provincial Executive. In the 1870s, Gerrit de Vries rose to the position of justice minister in a government he had formed himself. Hugo's mother, the daughter of C.J.C. Reuvens, professor of archaeology at Leiden University, was highly conscious of her social status. As respectable members of the Mennonite community, they also felt a burden of responsibility for the world around them.

Hugo was a clever, serious boy, who started picking all kinds of plants and flowers in the fields and taking them home with him at a very early age. But he did not know how to preserve them. Through his father's connections, he made the acquaintance of Professor C.A.J.A. Oudemans, then professor of botany at the Athenaeum Illustre, who taught him how to make a herbarium. By 1860, when he started attending gymnasium (secondary school with classics) he had collected so diligently that his herbarium, with a hundred plants, received an honourable mention by the Society of Agriculture.¹⁹

After gymnasium Hugo de Vries studied botany at Leiden University. There he read Darwin's *On the Origin of Species*, which made a deep impression on him. The concept that species are subject to variation determined not only his scientific views but also his ideas about society. Those who understood the laws according to which species are formed would be capable of cultivating new, stronger crops at will, and possessed the key to social progress. 'Knowledge is power: may that power be used for the good everywhere and at all times', wrote the young academic, with heartfelt conviction.²⁰

After Leiden, De Vries continued his studies in Germany, working under Julius Sachs at the University of Würzburg, Germany – which was then the academic heart of experimental botany. He became a skilled experimentalist, something entirely new in the world of natural history.

In the mid-1880s, by which time De Vries had been appointed first part-time professor (1878) and then full professor (1881) of plant physiology at the University of Amsterdam, he launched a series of experiments designed to determine the laws of genetic variation. In the early 1890s he believed that he was close to uncovering the secret of variability. Although it was not until

¹⁹ E.J.A. Zevenhuizen, *De Wereld van Hugo de Vries: De inventarissen van het archief van Hugo de Vries en van de andere archieven en collecties van de Bibliotheek Biologisch Centrum*, UvA, 1996, p. 17.

²⁰ See e.g. B. Theunissen, 'Nut en nog eens nut': *Wetenschapsbeelden van Nederlandse natuuronderzoekers 1800-1900*, Hilversum, Verloren, 2000, pp. 125-148, esp. p. 141; B. Theunissen, 'Knowledge is power: Hugo de Vries on Science, Heredity and Social Progress', *British Journal for the History of Science*, 1994, pp. 291-311.

the dawn of the new century that he finally published his *Mutationstheorie* (Mutation Theory),²¹ he was already convinced before then that he had discovered a ground-breaking supplement to Darwin's masterpiece.

At the heart of his theory were what he called 'pangenes' (later abbreviated to 'genes'), the carriers of each individual's characteristics. If a new pangen came into being, a new characteristic was born. The formation of species relied on 'progressive mutations' – that is, the creation of new pangenes. With the quantity of new characteristics, and therefore also the greater external and genetic differentiation, new species were the next step in the evolutionary process from simple to more complex life forms. Selection – the concept that was central to Darwin's theory of evolution – was of only secondary importance to De Vries. Selection did not generate new species; it merely determined which ones could survive. Mutations were the driving force behind evolution.²²

But how mutations came into existence De Vries could not yet fathom. That was the next step in the academic process. Once this hurdle had been overcome, new species could be created at will, independent of chance. And that was the objective of science: eventually to return to practical application in a form 'in which it can be applied directly.'²³ De Vries was an idealist – no revolutionary, in spite of occasional sallies into revolutionary rhetoric. 'New races and new species! This will henceforth be the rallying cry, first for science and then for its applications, for the flowering of agriculture and the prosperity of nations!'²⁴

The *Mutation Theory* made him world-famous, although its popularity was gradually smothered by the constant flow of criticism from home and abroad. De Vries was honoured with accolades and distinctions, tributes and busts, honorary memberships and invitations – being permitted to visit him was a favour much appreciated, and a signed portrait of him a coveted souvenir.

For a short period of time, De Vries was ranked among the world's great biologists: he inspired Thomas Hunt Morgan (1933 Nobel Prizewinner) to perform his research on heredity in the fruit fly, and corresponded with Jacques Loeb – like De Vries, a former student of Julius Sachs – who would later become known as the first biotechnologist *avant la lettre*. When the daily newspaper *De Nieuwe Amsterdammer* asked its readers in 1916 to compile a list of the

²¹ De Vries, *Mutationstheorie*, 1901-03; published in English as *The Mutation Theory* in 1909-10.

²² Based on Zevenhuizen 1996.

²³ Hugo de Vries, 'Wetenschap in dienst der praktijk', *Landbouwkundig Tijdschrift* 9, 1893, no. 4, pp. 217-230, esp. p. 230.

²⁴ Theunissen 2000, pp. 125-148, esp. p. 135.

ten most important Dutchmen in the past fifty years, De Vries came fourth, after Thorbecke, Jozef Israëls, and Multatuli.²⁵

‘Krelage consistently urged academics to collaborate with those working in the field’, wrote De Vries in his autobiography towards the end of his life, and the same applied to De Vries himself. Agriculturalists and horticulturalists saw him as the absolute scientific authority in their field, because of the constant stream of articles he published in their trade journals.

Whether Jacob Krelage and Hugo de Vries were acquainted while De Vries was living in Haarlem is uncertain. One thing is clear, however: De Vries’s marriage to Krelage’s cousin Louise Egeling in 1869 created a family relationship between them. After that, the two families strengthened their mutual ties in various ways. For instance, the young Ernst Krelage was invited to stay with ‘Uncle Hugo and Aunt Wies’ in Amsterdam for a few weeks in preparation for starting his university career there, and ‘Uncle Hugo’ paid tribute to his Haarlem connections by naming one of his sons ‘Ernst.’

The ties between the two families were also beneficial in other, more businesslike ways. When Jacob Krelage founded the Scientific Committee of the Dutch Society of Horticulture and Botany in 1889, he asked De Vries to become a member, and in 1891, De Vries in turn asked Krelage to chair the executive committee of the Netherlands Phytopathological Society that he had recently founded.

It seems to have been typical of De Vries to seek, through acquaintances and students, to expand, protect – or at times to partition – his scientific empire. He himself was keenly interested in research on varieties, around 1890; so why should he not protect that area of research, and encourage others to study plant pathology instead?

‘Your foundation is virtually guaranteed to succeed, with the right choice of director’, he assured the Scholten family.²⁶ ‘A laboratory of this kind would fill a gap that is universally felt as such in this country ... particularly in recent years. Our Phytopathological Society, for instance, would immediately applaud it ... as a step towards the realization of its aspirations. The foundation could count on universal support and cooperation; a laboratory for plant pathology could move straight to the vanguard of this entire field. It would soon, if not immediately, become the centre to which all related questions on matters of agriculture and horticulture throughout the country would be addressed.’

De Vries was now well into his stride: ‘Choosing Amsterdam as the foundation’s headquarters would be highly advantageous, partly because it is a

²⁵ *Ibid.*, p. 146.

²⁶ Hugo de Vries to Scholten, 29 November 1983, archives of the wcs.