

Education through the enjoyment of nature. Hugo de Vries and the popularization of biology

MARGA COESÈL

Frans Halsplantsoen 30, 1399 EW Muiderberg, The Netherlands

INTRODUCTION

Surprisingly, little attention has been paid to a part of the activities of Hugo de Vries that was highly valued by himself, namely, the popularization of biology. The appreciable attention paid to De Vries as a rediscoverer of Mendel's Laws and on account of his mutation theory led to a one-sided image of him as a geneticist and evolutionist. His merits as a plant physiologist have also been mentioned repeatedly, but the fact that he had an expert cognisance of the whole field of botany and was active as a popularizer is hardly known. In particular, foreign scientists often see De Vries only as an experimental researcher and not as the all-round botanist he certainly was.¹

That Hugo de Vries himself attached much value to popularization is evident from the fact that about half of his many publications are of a popular scientific nature.² De Vries himself was so much convinced of the importance of botany for Man and human society that he could not help trumpeting this continually. How was it possible that this aspect received so little attention?

That De Vries put much of his energy in the popularization of biology was widely known during his professional career and this was amply appreciated by his contemporaries.³ On his 80th anniversary, in 1928, much praise was bestowed upon him as a popularizer but at the time of his decease, in 1935, he was almost exclusively commemorated as a geneticist and plant physiologist.⁴ His merits as an ardent believer in the broad social significance of popularization of science were only recognized again in the 1990s.⁵

Foreign workers who wished to acquire a complete picture of the career of Hugo de Vries had to deal with a language barrier, because De Vries' popularizing papers were mostly written and published in Dutch. Often they were not even aware of the existence of these writings. Most of De Vries' popular scientific publications are not included in the *Opera e Periodices Collata*, re-issues of his work in seven bulky volumes.⁶ It was also originally intend to re-issue his popular papers in an additional volume, but this was never published.⁷ Authors with an adequate command of the Dutch language, therefore, could become acquainted with De Vries' popularization papers but paid little or no attention to them.⁸ Did such workers find the activities of De Vries in this field too uninteresting to be mentioned, or did they think it embarrassing that a scientist wrote papers about such trivial matters as the storage of potatoes in winter?

In scientific circles, in particular those of natural science, one is in general critical and shy of popularization because this often goes together with shallowness and simplification. Proper popularization is by no means easy, because it requires both a sound knowledge of the subject matter and creativity and also an ambition to convey one's cognisance in a comprehensible manner. Few scientists possess these faculties. Ever since the rise of natural sciences the general public felt a need for experts who could explain the developments in their respective disciplines to a lay public—a need

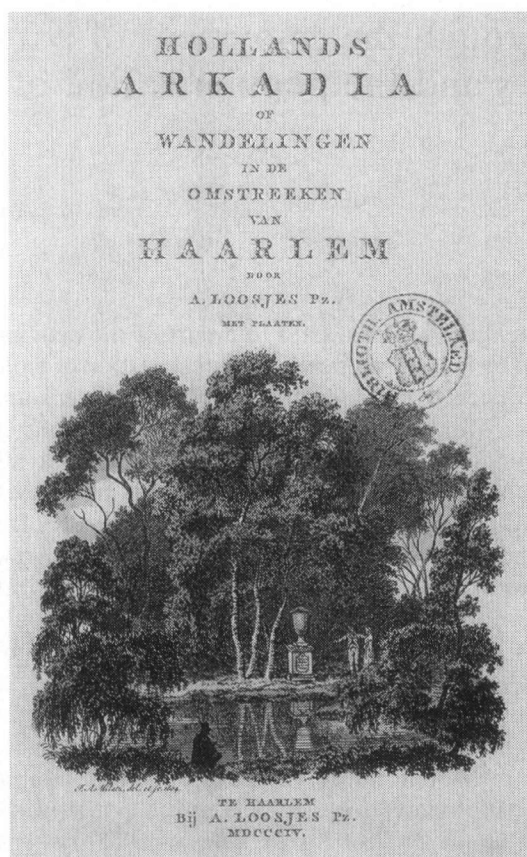


Fig. 21. Title page of A. Loosjes Pzn. (1804): *Hollandse Arkadia* (Haarlem), an early 19th century book dealing with Haarlem and its surroundings (Central Library, University of Amsterdam).

that persisted or even steadily increased up to the present day—nowadays we even have media professors.⁹ Popularization remains balancing on the border lines of science. There is always a danger that popularizers—often not the worst in their disciplines—overshoot their mark and for the sake of public attention make concessions to their science or digress beyond their professional knowledge into the fields of religion and morals. I will try to explain how De Vries fared as a popularizer on using three questions: (1) What were his motives? (2) what did he do as a popularizer, and (3) what was the result?

BACKGROUND AND MOTIVES

Hugo de Vries was born in 1848, the year in which the famous new Dutch constitution appeared; in several respects the herald of a new era. Hugo hailed from the prosperous and erudite Haarlem society.¹⁰ His father, the barrister Gerrit de Vries, started his career as an advocate to rise to a position in the Dutch government. That Hugo chose to study botany was, in the light of that time and in view of his father's position, decidedly uncommon.¹¹ Yet there were occurrences in his youth and student days that rendered his passion for botany and his need to spread his knowledge understandable.

HAARLEM

In the middle of the 19th century, Haarlem was a small province town that enjoyed an international reputation as a centre of bulb cultivation. The interest of the inhabitants was not only in cultivated plants but also in wild flowers and garden architecture.¹² Haarlem was considered in Holland as Florence was in Italy: the city of flowers par excellence.¹³ Although Haarlem could not boast a university, in the circles of prosperous members of society there was an appreciable interest in teaching and in science; there was a strong need not only to imbibe scientific knowledge but also to spread this knowledge.¹⁴

As early as 1752, a number of prominent citizens took the initiative to found the *Hollandsche Maatschappij der Wetenschappen* (Dutch Society of Sciences), the first scientific society of standing in The Netherlands.¹⁵ A few decennia later the foundation was laid of an equally influential scientific organization, the *Teylers Stichting* (Teylers Foundation).¹⁶ Apart from the furtherance of scientific research, of natural sciences in particular, the activities of the two societies aimed at the distribution of scientific knowledge. Among other things, a museum of natural history was founded, the first in The Netherlands.¹⁷ The striving in Haarlem for spread of knowledge is also evident from the founding, in 1789, of one of the first departments of the *Maatschappij tot Nut van't Algemeen* (Society for General Benefit).¹⁸ By the middle of the 19th century Haarlem could also boast of societies for the furtherance of industry and agriculture and also the *Haarlemsche Debating Society* (Haarlem Debating Society) was erected.¹⁹ Members of this club could train themselves in matters of general interest and inquire deeply into the most recent scientific developments abroad, such as Darwin's theory of descent. The latter work had already in 1860, i.e. only 1 year after the publication of *The Origin of Species*, been introduced into The Netherlands by their townsman T.C. Winkler.²⁰ It was members of this Haarlem gentlemen's club in particular who inspired De Vries to work as a popularizer of biology, namely the publisher A.C. Kruseman, the physician D. Lubach, the teacher W.M. Logeman, the bulb merchant J.H. Krelage and the botanist F.W. van Eeden.

Arie Kruseman was an inspired and leading publisher who was a propagator of the spreading of science.²¹ Also through his efforts Haarlem became a centre of popular scientific publications.²² Kruseman proposed, among other things, to start the publication of the *Album der Natuur*, the first Dutch periodical for natural science, that appeared in 1852 under the editorship of the Utrecht professor P. Harting and Kruseman's fellow club-members Lubach and Logeman.²³ This *Album der Natuur* was a scantily illustrated and—to our modern standards—dry journal, but owing to the relatively independent view of science at that time advanced and of importance for the development of natural science. This periodical also contributed to the start of the nature study movement. From circa 1855 there appeared publications inciting attention for indigenous nature, a subject previously hardly regarded as of interest or worthy of appreciation.²⁴

These contributions were mostly by F.W. van Eeden sr, the son of a Haarlem bulb merchant.²⁵ Frederik (Frits) van Eeden was an ardent naturalist and amateur botanist interested in all facets of botany, from the occurrence and life histories of wild plants to plant physiology. The both florid and sober descriptions of his botanical field trips gave his readers a fresh outlook on indigenous nature and landscapes. He also urged his readers not to be satisfied with looking at pretty pictures at home but, whenever possible, to find out things for themselves. He considered the study of nature to be a source of pleasure in life and nature as a treasure-trove of truth.²⁶



Fig. 22. F.W. van Eeden, amateur botanist and author of inspiring popular-scientific books and articles on botany and the Dutch landscape (Frederik van Eeden Society, University of Amsterdam).

Van Eeden sold his bulb firm to J.H. Krelage, director of Krelage & Son, at that time the most important and greatest nursery in Haarlem and surroundings.²⁷ Jacob Heinrich Krelage was an able, influential person who took many initiatives to arouse interest in his kind of trade and in botany as a whole, for instance by organizing extensive flower shows and laying out a winter garden for the benefit of the general public.

He also took the initiative to found the *Algemeene Vereeniging voor Bloembollencultuur* (General Society for Bulb Growing), in 1860, and the *Nederlandsche Maatschappij voor Tuinbouw en Plantkunde* (Dutch Society for Horticulture and Botany), in 1872. Like his father and later his son, Krelage had a great interest in science. He took great care to apply the proper nomenclature and was the author of numerous contributions in Dutch and foreign horticultural journals.

Haarlem, with its wealth of wild and cultivated plants and its active lovers of nature, must have been an inspiring entourage for such a receptive child as Hugo. Hugo lived for over 14 years in Haarlem and during this period his hobby in botany arose. This hobby—in his own conviction—formed the basis for his later work.²⁸ Already as a youngster, Hugo went botanizing with his mother, M.E. de Vries-Reuvs, and we may assume that she frequently took him to Krelage's nursery. When at primary school, he went for long walks through the forests and dunes of Kennemerland (the surroundings of Haarlem) and he began to collect plants for his herbarium. Possibly, young Hugo already had a personal contact with Van Eeden, but without doubt the latter's writing stirred his desire to search for plants.²⁹ Besides his hobby in botany, De Vries' interest in popularization was also aroused. He knew both Haarlem editors of the successful *Album der Natuur*: the physican Lubach was a friend of his father and Logeman was his teacher at the gymnasium.³⁰ Both men were ardent protagonists of popularization of experimental natural science.³¹ Presumably already at this time, young Hugo felt a desire to write, like Van Eeden, about the enjoyment of botany. He could not surmise that later he would become a colleague of Lubach and Logeman as co-editor of the *Album der Natuur*. De Vries' interest in the popularization of science was not only fanned by the Haarlem cultural and social climate but also afterwards remained connected with that town. Most of his popular scientific papers were published by publishers in Haarlem.

In other respects De Vries also had a strong bond with his town of birth. He envolved as a member or speaker in the activities of all the above-mentioned organizations in Haarlem, from the Dutch Society of Sciences to the General Society for Bulb Growing.³² He also remained in contact with the firm of Krelage & Son.³³ Finally, it is presumably not by coincidence that Hugo de Vries married a Haarlem girl. Louise (Wies) de Vries-Egeling was the eldest daughter of L.J. Egeling, a socially involved physican who was also a member of the Haarlem Debating Society.³⁴

LEYDEN

As we have seen, the basis of De Vries' interest in popularization was laid in Haarlem, but his motivation for such activities became stronger during his attendance of a gymnasium in The Hague and more so during his study at the Leyden university. During this time he was intensively in contact with Van Eeden,³⁵ but the strongest stimulus was from the professors of whom he was a pupil, such as W.F.R. Suringar in Leyden and C.A.J.A. Oudemans in Amsterdam.³⁶ These academics were of the opinion that the study of nature is a means to education and culture. They ventilated this view in wide circles, thus following in the footsteps of their colleague, the famous Pieter Harting, who was a versatile naturalist and performed his scientific inquiries against the background a considerable involvement.³⁷ Harting was a gifted popularizer whose comportment and work was often imitated. The botanists with whom De Vries came into contact during his schooling did not only draw attention to the practical usefulness

of botany but also mentioned the pleasure offered by the study of botany to its practisers. The writings of J.J. Rousseau and Goethe provided an important source of inspiration. The books on botany of these two serious and ardent plant-lovers were much admired by botanists in the 19th century. De Vries repeatedly used sentences borrowed from Goethe as a *leitmotif* in his studies.³⁸

AMSTERDAM

During his mastership in Amsterdam and especially after his appointment at the newly founded University of Amsterdam, in 1877, De Vries once more found himself in surroundings in which there was an interest in the popularization of science. The elevation of the old Athenaeum Illustre to the University of Amsterdam was celebrated by an extension of the teaching staff, in particular the appointment of a number of talented natural science workers. Within the young science faculty the members maintained a mutual contact and they were deeply interested in each others' disciplines. De Vries, who cooperated in particular with the chemist J.H. van 't Hoff, at that time emphasized the general validity of natural laws and the importance of a multidisciplinary approach.³⁹ It was a golden time for natural science; important discoveries were made and a strong need arose to spread both knowledge and results.⁴⁰ This was activated among other things through the Genootschap ter Bevordering van Natuur-, Genees- en Heelkunde (Society for the Advancement of Natural, Medical and Surgical Sciences) that had renovated itself in 1870.⁴¹ De Vries was an active member of this organization that—next to the advancement of science—also set itself to the conferment of information. Popularization in this circle was, however, almost completely aimed at people with a university education: physicans, scientists and secondary schoolteachers. At the same time in Amsterdam a popularization movement came into being that aimed at the spreading of the cognizance of nature among people with a limited education, the youth and amateurs. This movement was initiated by schoolteachers, such as E. Heimans and Jac.P. Thijssse (two amateur biologists who were—just like De Vries—inspired by the work of F.W. van Eeden). Their actions and publications resulted in the 1890s in a revival of interest in indigenous nature and nature studies, the so-called biological reveil.⁴² The Amsterdam Plantage quarter, the place where De Vries lived and worked, formed the centre of activities.

ADVANCES IN BIOLOGY

De Vries' impulse to popularize science was connected with the revolutionary development of biological inquiry in the 19th century. During De Vries' lifetime the quiet stream of descriptive biology attained a delta to fan out in various directions: physiology, cytology, biogeography, ecology and paleontology. Concomitantly the base was laid for such disciplines as phytopathology, microbiology, genetics and even biochemistry, biophysics and biostatistics. The idea of evolution, i.e. the notion that the living world is not static but is conceivably subject to change and advancement, gave the study of nature a previously unknown impetus. Biology gained an important place among natural sciences. De Vries was elated at the change in his field of study. He showed his conviction repeatedly that the period of the rigid Linnean system of classification was over and that biological science had turned into totally new roads with Julius Sachs and Charles Darwin.⁴³ He had great expectations of the new possibilities of biological

research and he was convinced of its contribution towards the welfare and happiness of his fellow men.⁴⁴

PUBLICATIONS

Soon after he had completed his university studies, in 1870, De Vries began to write publications aimed at the general public. When he was a secondary schoolteacher he wrote such booklets as *De voeding der planten* (1876) and *Het leven der bloem* (1877), that were immediately well received and were later reprinted. After these first popular books many more were to follow, among which were the similarly successful travel books, but the majority of the contributions by De Vries were his popular scientific papers. He wrote several hundred articles for a broad public, in over 80 different periodicals, both journals and newspapers, and both Dutch and foreign ones. In some of these he only published once or twice, but in others with great regularity, often in journals he was associated with as an editor or contributor.

One of the first popular journals De Vries published in was *Eigen Haard*, an illustrated family journal published, from 1875 on, by Kruseman in Haarlem. *Eigen Haard* was the protestant liberal counterpart of the *Katholieke Illustratie*, a famous magazine for the Catholic population. In the broad range of subjects the reader was offered De Vries wrote about insectivorous plants, parasites and the preservation of food. The contents of his contribution was not so simple as one might expect from some of the titles. The young scientist taught his readers—who he certainly did not underestimate – particular the practical results of plant physiological research.

Eigen Haard formed a step towards the *Album der Natuur*. After having published previously in it,⁴⁵ in 1885 he succeeded the – much admired by him – Harting who had resigned as an editor and died shortly afterwards. Up to 1909, when its publication was stopped, De Vries wrote one or more papers for the *Album* every year, over a 100 in all. He also contributed tens of reviews annually for its *Wetenschappelijk Bijblad* that, since 1857, appeared as a supplement of the *Album der Natuur*. De Vries wrote in the *Album der Natuur* about the things he was working on, mainly plant physiology and crossing experiments, but also phytogeography and ecology. He also reported extensively the work of other researchers to his readers – he never tired of praising the work of Darwin.⁴⁶ De Vries, moreover, philosophized with great pleasure about science itself, about the nature and meaning of science and about the relation between science and capital and the *modus operandi* of scientists.⁴⁷

The ideal proclaimed by Harting: 'Nature as a means of education', was endorsed heart and soul by De Vries. In the *Album der Natuur* he mentioned repeatedly the practical usefulness of his profession. He maintained that no other field of science had more contact with daily life than botany.⁴⁸ De Vries' predictions of a collaboration between science and practice were mainly inspired by his own experience with market gardeners and nurserymen, but he also liked to speculate, especially with regard to studies of heredity. Thus he more or less anticipated that genetics would, in the future, become 'the strongest means to solve social miseries'.⁴⁹

Another important periodical De Vries published in regularly was *De Gids*, a still-existing, all-round cultural and literary journal published from 1837 onward, that voiced the ideas of the upper layer of society and considered to be leading in these circles.⁵⁰ Although literature was the principal topic, from the beginning natural science and medicine also came to attention. From the middle of the 19th century onwards *De*

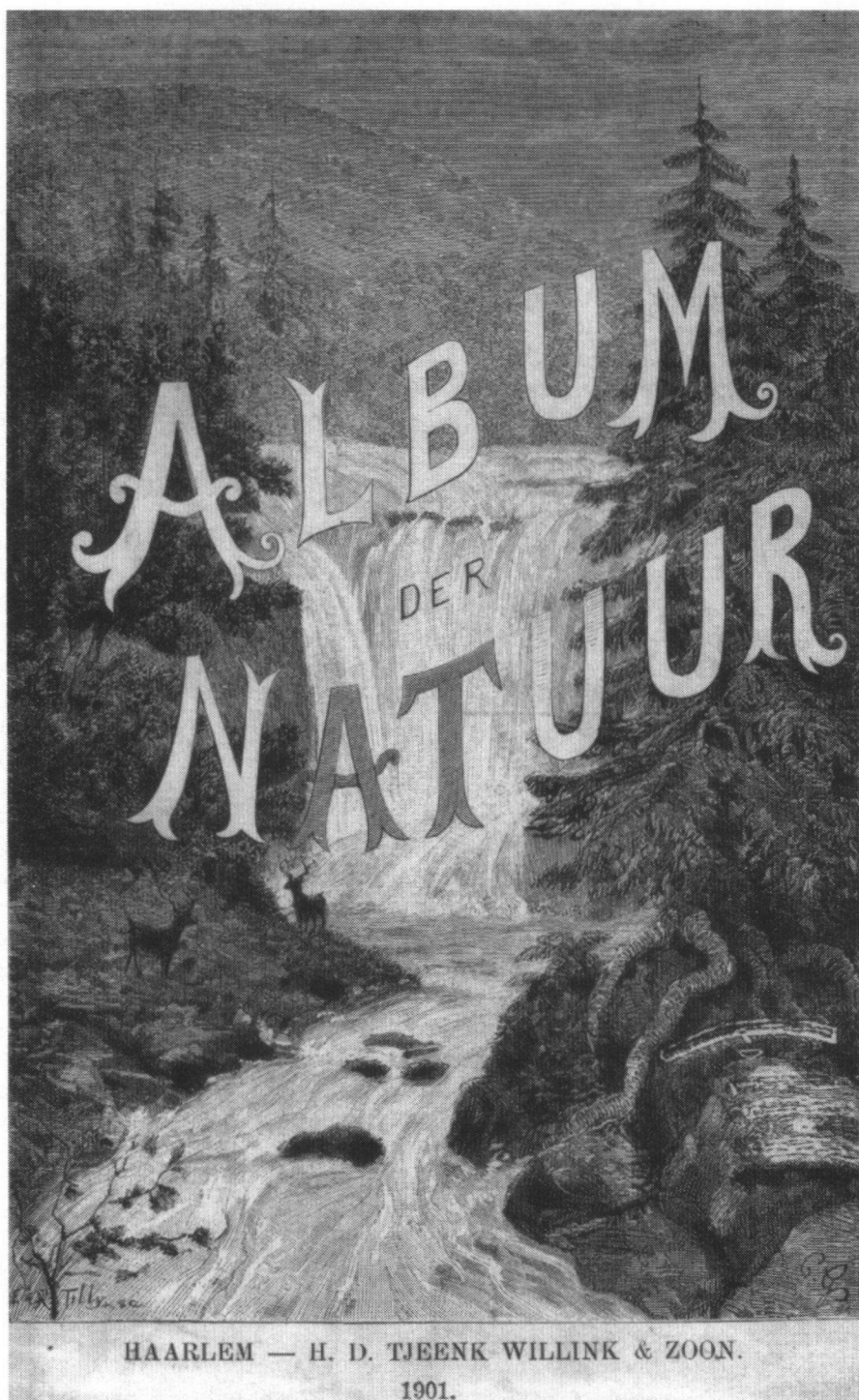


Fig. 23. Front page of the *Album der Natuur*, the first popular-scientific journal of science in which appeared most of Hugo de Vries' popular publications (Library of the Biological Centre, University of Amsterdam).



Fig. 24. Vignette of *Eigen Haard*, an all-round cultural family periodical in which Hugo de Vries wrote his early popular publications (Library of the Biological Centre, University of Amsterdam: Archive Hugo de Vries).

Gids was also instrumental in the diffusion of scientific theories. Prominent scientists contributed papers to the journal and often were members of the editorial board, such as the Utrecht professor of zoology A.A.W. Hubrecht, a pupil of Harting.⁵¹ Apart from being a convinced Darwinist, he was a staunch supporter of De Vries and a trail-blazer who introduced and praised the mutation theory in *De Gids*.⁵² De Vries himself wrote about 10 papers in this journal between 1876 and 1909, among which several detailed and important papers, such as one about bastardizing and fertilization, and his travel reports from the United States, were printed immediately upon arrival.⁵³ More than in other publications, in *De Gids* De Vries strongly expressed his strong optimism regarding the advance of civilization, his unlimited faith in the development of science and the importance of science for agriculture and medical care. His papers on experimental stations for sugar cane cultivation in Java ends with an almost conjuring: 'Everywhere there is life, everywhere advancement where formerly in quiet resignation: "we do not know obtained. Still the experimental stations louder and louder cry: we wish to know, we shall manage'.'⁵⁴

De Vries did not only publish in the above-mentioned periodicals of general nature but also wrote often and eagerly for agricultural journals, such as the *Maandblad van de Hollandsche Maatschappij van Landbouw*, the *Nederlandsche Tuinbouwblad* and the German *Landwirtschaftliche Jahrbücher*. In these kinds of journals De Vries consistently and zealously gave advice on both the practical and the scientific aspects of the cultivation and improvement of agricultural and horticultural crops. It is characteristic of De Vries that he always attempted to solve the problems emanating from the work in this sector by an experimental approach.⁵⁵ He described these experiments in a lucid manner and always pointed out the usefulness to agriculture and commercial gardening. With his studies (and those of his pupil J.H. Wakker) of the cause and control of dreaded plant diseases he could often convince growers reluctant towards science of the importance of cooperation and applied research.⁵⁶ De Vries stimulated the establishment of phytopathology and microbiology in The Netherlands.⁵⁷

De Vries also had a great influence on nature studies in his country, albeit mainly indirectly. He hardly advocated nature directly to the general public, but he did support the work of amateurs in this field. He immediately wrote an enthusiastic review in *De Gids* of the journal *De Levende Natuur* founded by Heimans and Thijssen and their colleague J. Jaspers, in 1896.⁵⁸ In the *Album der Natuur* he zealously praised the popular booklets of the amateur biologists published at that time.⁵⁹ What De Vries recognized and appreciated in these amateurs was their serious love of nature and their conviction that repeated sojourn in natural surroundings make one happy and contributes to one's education. 'Education through enjoyment of nature' was their common slogan.⁶⁰

LECTURING

Those who, on account of the almost unsurveyable stream of De Vries' publications, think that he preferred to do this popularizing work from behind his desk are mistaken. De Vries was fond of lecturing in public. He loved teaching and bestowed much care on delivering popular scientific lectures. He lectured in all corners of The Netherlands (from Groningen to Middelburg), in cities elsewhere in Europe, such as Paris, Berlin and London, and also in the United States, but most frequently and by preference for the *Maatschappij Diligentia* in The Hague.⁶¹ In the building of this society De Vries was a welcome guest and one of the most faithful speakers. He delivered his maiden natural science speech as early as 1873, shortly after he had completed his university studies. With his lecture on contagious diseases of crops he was immediately a great success. In order to illustrate his lectures he brought along boxes full of wall plates, plant preparations and live material from the Hortus, convinced as he was of the importance of visual tuition.⁶² The day after his lecture of 8 February, 1879 the journalist P.A. Haaxman, who faithfully reported the meetings, wrote in his newspaper: 'The cold weather yesterday did not have a detrimental influence on the attendance of the natural science lecture in Diligentia. Even the ladies did present themselves in great force. This is not surprising because the sympathetic young scientist was the speaker and discussed a topic that lively aroused the interest of all housewives'.⁶³ One of the most faithful listeners was De Vries' mother who always maintained a lively interest in her son's work and attended all his lectures.

In the winter of 1898–99 the Diligentia lectures were extended to courses, series of about 10 lessons on a certain subject, held once a fortnight on Saturday afternoons.⁶⁴ De Vries held his botanical courses with only one interruption, in 1900–01, when these lectures were taken over by his pupil H.P. Wijsman, up to 1914, the year his mother died. After her decease De Vries discontinued his lectures in Diligentia. In the meantime in other fields his work as a popularizer came to an end. The stream of scientific popular papers had almost stopped. After 1910 De Vries only contributed papers of this kind to the German journal *Aus der Natur*. De Vries used all his energy to extend his *Oenothera* studies and, moreover, at about that time in other layers of society the hope was waning that natural science and technology would solve all social problems.

HOW

The enormous achievement of De Vries as a popularizer cannot be explained from his motivation alone, but has also much to do with his literary and didactic talents. He wrote fluently and with ease. In contrast to his scientific writings, that are sometimes

rather obscure, his popular publications excel in their clear and attractive style. His sense of language was a family trait. His father had, in addition to Law, also studied Dutch and even attained a doctor's degree in it.⁶⁵ His uncle Matthias De Vries, professor of Dutch at Leyden university, became known for his *Woordenboek der Nederlandsche taal* and the spelling of Dutch (De Vries & Te Winkel). His grandfather and other family members also had a marked affinity with language and literature.⁶⁶

As a speaker, De Vries had the advantage of his good-looking appearance. He had a sonorous voice and spoke calmly without raising his voice. Although he did not possess the Gallic ideal of oratorical power everybody listened to him entranced, because what he had to tell was found interesting and he brought it with a contagious enthusiasm.⁶⁷ When De Vries grew older, he impressed people through his tall stature, long beard and especially his radiating power. In 1912 a reviewer reported: 'When listening to him one feels oneself in the presence of one of the greatest thinkers whose mind occupies itself with the analysis of one of the most complicated problems of new science'.⁶⁸

RESULTS

In a rough outline, what was the outcome of De Vries' popularizing activities? To begin with, through his repeated lecturing and his stream of publications, De Vries himself became famous. It is clear that his fame was also due to his scientific studies, but the fact that he did not spread his knowledge among his fellow scientists alone, but also liked to convey his cognizance to a wider general public raised his popularity. During his lifetime De Vries was a well-known Hollander whose conduct was enlarged upon in the press. In 1916 he scored fourth place in the inquiry of a newspaper: who are the 10 most prominent Dutchmen of the last half-century? De Vries received more votes than did Abraham Kuyper and Van 't Hoff and came only after J.R. Thorbecke, Jozef Israëls and Eduard Douwes Dekker.⁶⁹

Already in his lifetime De Vries was considered to be a 'scientific journalist' whose work was 'full of learning and yet within everyone's reach'.⁷⁰ Although De Vries occasionally ventured on the slippery road of morals and sometimes presented his audience with unreal expectations of the future, in his role as a popularizer he was mainly objective and predominantly restricted himself to his own field of research. His popularizing activities resulted in the spread of knowledge and its practical application and in particular stimulated the experimental approach. De Vries built several bridges, namely a bridge between science and interested laymen, between science and practice, several between different branches of science and even to education and tuition. De Vries ventilated pronounced ideas on these latter subjects very similar to those of Maria Montessori, who considered the work of De Vries on genetics as a source of inspiration.⁷¹

One may conclude safely that De Vries had a immense influence in the field of popularization. One might even posit that as a scientific journalist and propagandist of experimental and applied natural sciences he had a greater influence and significance than with his scientific inquiries. Whatever the case may be, towards the end of his life De Vries distanced himself from both aspects. In about his 70th year he discontinued popularization and in his 80th year the stream of scientific publications stagnated. Hugo de Vries ended his life as he had commenced: as a lover of wild and cultivated plants.

ACKNOWLEDGEMENTS

In preparing this paper, I gratefully took advantage of Hugo de Vries' archive (Faculty of Biology, University of Amsterdam) as ordered by E.J.A. Zevenhuizen.⁵⁶ Many thanks are due to Prof. dr A.D.J. Meeuse for help with the English translation of the manuscript.

NOTES AND REFERENCES

1. G.E. Allen, 'Hugo de Vries and the reception of the mutation theory', *Journal of the History of Biology* 2: (1969) 55–87; B. Theunissen, 'De beheersing van mutaties. Hugo de Vries' werdegang van fysioloog tot geneticus', *Gewina* 15: (1992) 97–115; B. Theunissen, 'Knowledge is power: Hugo de Vries on science, heredity and social progress', *British Journal for the History of Science* 27: (1994) 291–311.
2. P.W. van der Pas, 'Hugo de Vries', in: C.C. Gillespie ed., *Dictionary of Scientific Biography* (New York, 1976) XIV: 95–105. Van der Pas speaks about 700 papers, half of them popular scientific in nature. Van der Pas himself mentions only titles of the most important scientific publications; P.H.W.A.M. de Veer, *Leven en werk van Hugo de Vries* (Groningen, 1969) reported in total almost 300 papers, but this list is far from complete; F.A.F.C. Went, 'Hugo de Vries', *Mannen en vrouwen van betekenis in onze dagen* 31 (Haarlem, 1900) 263–320. Went reports 180 papers by De Vries, among which is a list of 55 popular writings.
3. J.C. Costerus, 'Prof. Hugo de Vries', *Eigen Haard* (1895) 261–264; F.A.F.C. Went (n. 2) 'Hugo de Vries'; J.W. Moll, 'Hugo de Vries', *De Nieuwe Amsterdammer* February 16, 1918, nr 164: 6–7.
4. Hugo de Vries-nummer (1848–1928) *Natura* (1928) 17–32; A.F. Blakeslee, 'Hugo de Vries 1848–1935', *Science* 81: (1935) 581–582; R.E. Cleland, 'Hugo de Vries 1848–1935', *Journal of Heredity* 26: (1935) 289–297; R.E. Cleland, 'Hugo de Vries', *Proceedings of the American Philosophical Society* 76: (1936) 248–250; O. Renner, 'Hugo de Vries 1848–1935', *Naturwissenschaften* 24: (1936) 321–324.
5. In 1969 P.W. van der Pas pointed at the significance of De Vries for floristics. P.W. van der Pas, 'Hugo de Vries als taxonoom', *Scientiarum Historia* (1969) 148–166. After that year, attention to De Vries' popular scientific work was paid only by: M. Coesèl, 'Inleiding. Thema-nummer Hugo de Vries', *De Plantage-Hortus* 5: (1990) 2–4; R.P.W. Visser, 'Hugo de Vries (1848–1935). Het begin van de experimentele botanie in Nederland', in: J.C. Blom e.a., eds, *Een brandpunt van geleerdheid in de hoofdstad. De Universiteit van Amsterdam rond 1900 in vijftien portretten* (Hilversum, etc., 1992) 159–178; Theunissen (n. 1) 'Beheersing van mutaties'; M. Coesèl, *Zinkviooltjes en zoetwaterwieren. J. Heimans (1889–1978). Natuurstudie en natuurbescherming in Nederland* (Hilversum, 1993); B. Theunissen, 'Natuursport en levensgeluk. Hugo de Vries, Eli Heimans en Jac.P. Thijsse', *Gewina* 16: (1993) 287–307; Theunissen (n. 1) 'Knowledge is power'.
6. Hugo de Vries, *Opera e Periodices Collata* (Utrecht, 1918–1927). A selection from De Vries' scientific papers offered by friends and admirers on the occasion of De Vries' 70th birthday, in 1918.
7. *Opera e Periodices Collata* (Utrecht, 1918) vol. I, preface.
8. De Veer (n. 2) *Hugo de Vries*; Van der Pas (n. 2) 'Hugo de Vries'; W.D. Margadant, 'Hugo de Vries', in: *Biografisch Woordenboek van Nederland I* ('s Gravenhage, 1979) 631–635; P. Smit, 'Hugo de Vries (1848–1935). Het veredelen van cultuurplanten', in: A.J. Kox and M. Chamalaun, eds, *Van Stevin tot Lorentz* (Amsterdam, 1980) 163–176.
9. G. Hage, 'Het glibberige pad van de show-professor', *HP/De Tijd* 23 January, 1998, 32–35.
10. J.F. van Bemmelen, 'De kwartierstaat van Hugo de Vries', *Sibbe, Maandblad van het Nederlandsch Verbond voor Sibbekunde* (1941) October; J. Lever, 'De genen van Hugo de Vries', *VU-magazine* 19: (1990) 18–26.
11. Went (n. 2) 'Hugo de Vries'. In that time, botanists by profession hardly occurred. Professors in botany were trained for medicine. Botany was considered a hobby or a sideline of medicine. Training for botany did not provide any prospect of employment.
12. A. Loosjes Pzn, *Flora Harlemica of Lijst der planten in het wild groeiende rondom Haarlem* (Haarlem, 1779); A. Loosjes Pzn, *Hollands Arkadia of Wandelingen in de omstreken van Haarlem* (Haarlem, 1804). The city of Haarlem was known for its 'Haarlemmerhout', a public forest. Moreover, in and around the city several famous private botanical gardens were situated, such as 'Plantlust', the garden owned by Martinus van Marum, which contained in 1814 about 3500 different plant species. The well-known nurserymen/landscape gardeners, J.D. Zocher and

- L.P. Zocher, also lived and worked in the city of Haarlem.
13. F.W. van Eeden, 'De flora der Hollandsche duinen', *Album der Natuur* (1866) 33–58.
 14. G.F. van der Ree-Scholten, ed., *Deugd boven geweld. Een geschiedenis van Haarlem, 1245–1995* (Hilversum, 1995) 385–408.
 15. J.A. Bierens de Haan, *De Hollandsche Maatschappij der Wetenschappen 1752–1952* (Haarlem, 1952); H. Bots, 'Van universitaire gemeenschap tot academische kring', Speech on the occasion of the 185th annual meeting of the 'Genootschap ter Bevordering van Natuur-, Genees- en Heelkunde' [Amsterdam, 1976].
 16. Teyler' 1778–1798. *Studies en bijdragen over Teylers Stichting naar aanleiding van het tweede eeuwfeest* (Haarlem, 1978); W.W. Mijnhardt, *Tot heil van 't menschedom. Culturele genootschappen in Nederland, 1750–1815* (Amsterdam, 1988) 295–396.
 17. J.A. Bierens de Haan, *De geschiedenis van een verdwenen Haarlemsch Museum van Natuurlijke Historie* (Haarlem, 1941).
 18. J. Huizinga e.a., *Gedenckboek Maatschappij tot Nut van 't Algemeen, 1784–1934* (Amsterdam, 1934); P.N. Helsloot, *Het NUT in Haarlem: twee eeuwen volksontwikkeling 1789–1989* (Haarlem, 1989).
 19. These organizations were the Hollandsche Maatschappij van Landbouw and the Nederlandsche Maatschappij ter Bevordering van Nijverheid. Concerning the Debating Society, see: E.H. Krelage, *De Haarlemsche Debating Society (1853–1899)* (Haarlem, 1935).
 20. T.C. Winkler (1822–1897), physician and popularizer of science, at the same time conservator of Teylers Museum and the first energetic advocate of Darwin's theory in The Netherlands as well. His translation of *The origin* appeared under the title of *Het ontstaan der soorten van dieren en planten door middel van de natuurkeus*, 2 vols, published by Kruseman (Haarlem, 1860).
 21. The Haarlem dispenser's son, A.C. Kruseman (1818–1894), in 1840 set up as a self-employed bookseller/publisher. In 1874, he associated with H. Tjeenk Willink. Kruseman was, among other things, publisher of the series *De natuurlijke historie van Nederland*. About Kruseman, see: J.W. Enschedé, *A.C. Kruseman 1818–1894*, 2 vols (Amsterdam, 1898–1902); F. Smit Kleine, 'Levensbericht van A.C. Kruseman', *Levensberichten van de Maatschappij der Nederlandsche Letterkunde 1896–1897*; E. Homburg, 'Van volksscheikunde tot technologie: popularisering van de chemie in de negentiende eeuw', *Gewina* 18: (1995) 72–101.
 22. Van der Ree-Scholten (n. 14) *Deugd boven geweld*; Homburg (n. 21) 'Volksscheikunde'. In the midst of the 19th century the city of Laurens Janszoon Coster was an important centre of printing and publishing. This period formed palmy days for popular scientific reading. Next to the printing office of Joh. Enschedé & Zonen (owner of the *Oprechte Haarlemsche Courant*, a leading newspaper in The Netherlands) several well-known publishers were established in this city, such as De Erven Loosjes, publisher of, e.g., the *Algemeene Konst- en Letterbode* (1788–1861), A.C. Kruseman, and the Erven F. Bohn, publisher of, e.g., *Isis* (1872–1881), a popular scientific journal that played an important role in the distribution of Darwinism in The Netherlands.
 23. Het *Album der Natuur* (1852–1909), was a variant of the popular periodical *Christelijk Album*, appearing at Kruseman from 1846. About the *Album der Natuur* see: Enschedé (n. 21) *Kruseman*; L. Coffeng, 'Het Album der Natuur. Popularisering van de natuurwetenschap in een tijdschrift uit de eerste [?] helft van de negentiende eeuw', *Groniek Historisch Tijdschrift* 123: (1994) 52–66; Homburg (n. 21) 'Volksscheikunde'; B. Theunissen, 'Een warm hart en een koel hoofd. Pieter Harting over wetenschap, de natie en de vooruitgang', *Bijdragen en Mededelingen betreffende de Geschiedenis der Nederlanden* 110: (1995) 473–498.
 24. At that time there was, generally, greater interest in exotic nature than in indigenous plants and animals. Moreover, nature study was considered as an indoor activity: in cabinet, study, or living-room. Typical of that is the title of a periodical set up in 1859 (A.W. Sijthoff, Leiden): *De Natuur, lectuur voor de huiskamer*.
 25. F.W. van Eeden sr (1829–1901), was general secretary of the Nederlandsche Maatschappij ter Bevordering van Nijverheid; later he was director of the Colonial Museum (the present Institute for the Tropics) and of the Museum for Arts and Crafts. He was also co-operator of the *Flora Batava*, a standard work on the Dutch flora. About F.W. van Eeden sr, see, e.g. J. Sturing, 'F.W. van Eeden 1829–1901', *De Levende Natuur* 6: (1902) 76–77; B.P. van der Voo, 'De pionier der botanische wandelingen †F.W. van Eeden', *De Natuur in!* 5: (1901) 274–286; J. Fontijn, *Tweespalt. Het leven van Frederik van Eeden tot 1901* (Amsterdam, 1990).
 26. F.W. van Eeden, *De duinen en bosschen van Kennemerland* (Groningen, 1868). F.W. van Eeden, *De botanie van het dagelijksch leven* (Purmerend, 1870); F.W. van Eeden, *Onkruid, botanische wandelingen door Nederland*, 2 vols (Haarlem, 1886), being a collection of papers published before in the *Album der Natuur*.
 27. E.H. Krelage, *Een eeuw bloembollenteelt. Het*

- honderdjarig bestaan der tuinbouwinstelling 'Bloemhof' herdacht (Haarlem, 1911). The family concern was founded by E.H. Krelage (1786–1855), who originated from Germany and established himself in Haarlem in 1811 as a grower of bulbs and ornamental plants. His son, J.H. Krelage, took over the management of the concern in 1855. About J.H. Krelage, see H. Witte, 'Levensbericht van Jacob Heinrich Krelage', *Levensberichten van de Maatschappij der Nederlandsche Letterkunde* 1901–1902.
28. W. van Itallie-van Embden, 'Sprekende portretten: Prof. dr Hugo de Vries', *Haagsche Post*, December 19, 1925.
 29. According to an anonymous author who based himself on information provided by De Vries' wife, as a boy De Vries went for walks in the surroundings of Haarlem, accompanied by Van Eeden. See: Redactie, 'Professor Hugo de Vries', *Revue der Uitvindingen en Ontdekkingen* 10: (1913) 228–234. According to Van der Pas (n. 5) 'Hugo de Vries als taxonoom', it was only in 1864 that De Vries made the personal acquaintance of Van Eeden.
 30. Aged 12, De Vries was contracted to Oudemans by Lubach in order to learn how to arrange a herbarium. Anonymous, 'Een eigenaardige hulde aan prof. de Vries', *Het Nieuws van den Dag* January 14, 1915, p. 3: Hugo de Vries went to the grammar school in Haarlem together with J. Nieuwenhuyzen Kruseman, the son of A.C. Kruseman. In 1895, this son became editor of the *Album der Natuur*.
 31. About W.M. Logeman (1821–1894) and D. Lubach (1815–1902), see: Enschedé (n. 21) *Kruseman*; Homburg (n. 21) 'Volkscheikunde'; Coffeng (n. 23) 'Album der Natuur'.
 32. From 1881, De Vries served on the Hollandsche Maatschappij der Wetenschappen and from 1902 onwards Teylers Tweede Genootschap; the auditorium in Teylers Museum has been named after De Vries. On behalf of the Maatschappij tot Nut van 't Algemeen, De Vries wrote a volume in the series *Kleine Geschriften*, entitled *Over veredelde landbouwplanten* (Amsterdam, 1899). He read papers and carried out research on behalf of the Algemeene Vereeniging voor Bloembollencultuur. He also gave readings to sections of the Nederlandsche Maatschappij voor Tuinbouw en Plantkunde; he was honorary member of this society and from 1891 to 1894 he was editor-in-chief of the *Nederlandsch Tuinbouwblad*. De Vries also contributed regularly to the *Maandblad van Hollandsche Maatschappij van Landbouw*.
 33. De Vries always kept in touch with J.H. Krelage, later on, also with his son Ernst H. Krelage (1869–1956); the latter even studied biology at De Vries for 2 years and became a successful crossbreeder in later years. A.W.J. de Jonge, 'E.H. Krelage', *Biografisch Woordenboek van Nederland* 3: (1989) 354–356.
 34. On 10 April, 1879 H. de Vries married E.L. Egeling (1855–1943), daughter of L.J. Egeling. About L.J. Egeling see: D. Lubach, 'L.J. Egeling In memoriam', *Eigen Haard* (1892) 808–810.
 35. In 1867, De Vries and Van Eeden together toured the island of Texel, to study the flora of the North Sea islands. Redactie (n. 29) 'Professor Hugo de Vries'. In 1871, both De Vries and Van Eeden joined the Dutch Botanical Society.
 36. C.A.J.A. Oudemans (1825–1906), after his study in medicine at Leyden, was professor of medicine and medical botany from 1859 and from 1877 to 1896 professor of botany and pharmacognosy, in Amsterdam. He became known, among other things, for *De Flora van Nederland*, 3 vols (Amsterdam, 1859–1862) and his studies on fungi. Oudemans was well acquainted with Van Eeden Sr. See epilogue by J. Fontijn in: Frederik van Eeden, *De paddestoel of De gevaarlijke hartstocht* (Amsterdam, 1996) 27–32. Oudemans regularly wrote in popular scientific periodicals, such as *Eigen Haard* and the *Volksalmanak van de Maatschappij tot Nut van 't Algemeen*; as for this latter society, he served on its executive committee from 1869 to 1870. About Oudemans see: J.W. Moll, 'C.A.J.A. Oudemans', *Berichte der Deutschen Botanische Gesellschaft* 26a: (1908) (12)–(33); J.W. Moll, 'Levensbericht van C.A.J.A. Oudemans', *Jaarboek der Koninklijke Akademie van Wetenschappen* (1909) (1)–(51); W.F.R. Suringar, 'C.A.J.A. Oudemans', *Eigen Haard* 21: (1895) 773–775. W.F.R. Suringar (1832–1898), after his study in medicine at Leyden, from 1859 was special professor of botany, and from 1862 to 1898 common professor in that same city. De Vries, because of his interest in experimental botany and Darwin's work, conflicted with Suringar but for life he maintained appreciation for the training in plant systematics he had received from Suringar. H. de Vries, 'Willem Frederik Reinier Suringar', *Eigen Haard* 23: (1897) 724–727; H. de Vries, 'W.F.R. Suringar', *Berichte der Deutschen Botanische Gesellschaft* 17: (1899) 220–224. Suringar's attitude towards popularization of biology came to the fore in his reading *De kruidkunde in hare betrekking tot de maatschappij en de hoogeschool* (Leeuwarden, 1868). Suringar contributed to the series *Blikken in het leven der natuur, tot bevordering van natuurkennis onder alle standen*, and he wrote for a broad public in periodicals such as *De Gids*.
 37. About P. Harting (1812–1885) see: P. Harting, *Mijne herinneringen. Autobiografie* (Amsterdam, 1961); Theunissen (n. 23) 'Een warm

- hart'. De Vries, who came to know Harting only after the end of his study, was a great admirer and follower of his, see: H. de Vries, 'Pieter Harting 1812-1885', *Het Nieuws van den Dag* December 7, 1885, p. 3.
38. De Vries' doctoral degree ceremony, in 1870, happened under a motto of J.W. Goethe: 'Dich im Unendlichen zu finden, musst unterscheiden und dann verbinden', in: H. de Vries, *De invloed der temperatuur op de levensverschijnselen der planten* ('s Gravenhage, 1870). In his reading as Rector Magnificus in 1898 he used as motto 'Alle Gestalten sind ähnlich, doch keine gleicht der andren, Und so deutet das Chor, auf ein geheimes Gesetz', in: H. de Vries, 'Eenheid in verandering', *Album der Natuur* (1898) 65-80. Goethe's verse: 'Vom Vater hab' ich die Statur' etc, was cited in: H. de Vries, *Oorsprong en bevruchting der bloemen* (Haarlem, 1904) 29.
 39. H. de Vries, *De ademhaling der planten* (Haarlem, 1878). Idem: De Vries (n. 38) 'Eenheid in verandering', Next to physics and chemistry, De Vries was also interested in mathematics and statistics. He wrote many papers on using statistical methods in biology, e.g. H. de Vries, 'Über halbe Galton-Curven als Zeichen discontinuierlicher Variation', *Berichte der Deutschen Botanischen Gesellschaft* 12: (1894) 197-207; H. de Vries, 'Die statische Methode in der Pflanzengeographie', *Die Naturwissenschaften* 11: (1923) 189-194.
 40. About the golden age of science: J.J. le Roy, 'De vacante-cursus te Groningen. Nabetrachting', *Album der Natuur* (1898) 225-244 (244); B. Wilink, 'Een inleiding tot de tweede Gouden Eeuw. De wetten van 1863 en 1876 en de wedergeboorte van de Nederlandse Natuurwetenschap', *Hollands Maandblad* 22: (1980) 3-9; K. van Berkel, *In het voetspoor van Stevin. Geschiedenis van de natuurwetenschap in Nederland 1580-1940* (Meppe, 1985); B. Willink, *De tweede Gouden Eeuw* (Amsterdam, 1998).
 41. K. van Berkel, M.J. van Lieburg and H.A.M. Snelers, *Het Genootschap ter Bevordering van Natuur-, Genees- en Heelkunde* (Rotterdam, 1991). De Vries joined this society in 1871 and he was appointed honorary member in 1903. From 1872 he regularly wrote in *Maandblad voor Natuurwetenschappen*, the organ of the section Natuurkundige Wetenschappen; from 1880 to 1884 he served on the editorship of this journal. De Vries was the first president (1897-1904) of the biological section of this society.
 42. Coesèl (n. 5) *Zinkvioletjes*; M. Coesèl, 'Opkomst van natuurstudie en natuurbescherming in Nederland: feiten en achtergronden', in: A. van Loon e.a., *De eeuw van Thijssse* (Amsterdam, 1996) 17-28.
 43. 'Daar verscheen Darwins boek. De gehele oude leer werd omver geworpen. Wat vroeger dé wetenschap was, was thans nog slechts het abc daarvan, het rangschikken en catalogiseren. Aan het onderzoek werden geheel andere eisen gesteld, de belangstelling werd in nieuwe wegen geleid, voor het nadenken, vergelijken, waarnemen en besluiten werd een onafzienbaar veld geopend.' H. de Vries, 'Over het ontstaan der soorten door mutatie', *Handelingen 8e Nederlandsch Natuur- en Geneeskundig Congres* (1901) 10-22; also in: *Album der Natuur* (1901) 193-224.
 44. 'Voorwaar een schoon ideaal! Bij te dragen tot de bevordering van het levensgeluk der mensheid is het grote doel van alle wetenschap.' De Vries (n. 38) 'Eenheid in verandering'.
 45. H. de Vries, 'Over het innemen van groenten en vruchten', *Album der Natuur* (1879) 161-181, 193-209. (On this item he had previously given a reading in the Society Diligentia, see n. 63). This is one of the many papers not mentioned in De Veer's (n. 2) *Hugo de Vries*.
 46. See, e.g. H. de Vries, 'Darwin's Afstamming van den mensch'. *Album der Natuur* (1885) 326-328, a recommendation of the translation (by H. Hartogh Heys van Zouteveen) of Darwin's book *The descent of man* (1871); H. de Vries, 'Darwin's biographie', *Album der Natuur* (1888) 113-130; H. de Vries, 'Darwin's denkbeelden over stoffelijke oorzaken der erfelijkheid', *Album der Natuur* (1889) 73-91.
 47. De Vries stated that capital spent on science always bears fruit, perhaps not immediately, but in the long term. H. de Vries, 'Kapitaal en wetenschap', *Album der Natuur* (1898) 353-366.
 48. De Vries (n. 45) 'Over het innemen'.
 49. 'En hoe verleidelijk is het denkbeeld, dat een grondige kennis en consequente toepassing van de wetten der erfelijkheid eenmaal zal blijken de machtigste factor te zijn tot leniging van zo vele maatschappelijke ellenden'. H. de Vries, 'Proeftuinen voor selectieproeven', *Album der Natuur* (1896) 65-75.
 50. R. Aerts e.a., *De Gids sinds 1837. De geschiedenis van een algemeen-cultureel en literair tijdschrift* (Den Haag, etc., 1987); R. Aerts, *De letterheren. Liberale cultuur in de negentiende eeuw: het tijdschrift De Gids* (Amsterdam, 1997).
 51. The botanist F.A.W. Miquel (1811-1871) was editor of *De Gids* from 1849 to 1851, the zoologist A.A.W. Hubrecht (1853-1915) was editor from 1893 to 1913.
 52. A.A.W. Hubrecht, 'Hugo de Vries' mutatie-theorie', *De Gids* 65: (1901) 1, 492-519; idem, 'De evolutie in nieuwe banen', *De Gids* 66: (1902) 2, 12-35.
 53. De Vries' first contribution to *De Gids* appeared

- in 1876: 'Beoordeling van L. Kny Botanische Wandtafeln', *De Gids* 40: (1876) 3, 374–376; his last one in 1909: 'Darwin's bezoek aan de Galapagos eilanden', *De Gids* 73: (1909) 2, 385–394. In between he wrote important papers such as 'Bastaardeering en bevruchting', *De Gids* 67: (1903) 2, 403–450; and 'De oorsprong der bloemen', *De Gids* 68: (1904) 1, 507–528. For many readers De Vries' papers on his travels to America (in 1904, 1906 and 1912) in *De Gids* (and other periodicals) were a first introduction to American nature. Afterwards the texts came out as books: *Naar Californië* (Haarlem, 1905), *Naar Californië II* (Haarlem, 1907), and *Van Texas naar Florida* (Haarlem, 1913).
54. H. de Vries, 'De proefstations voor suikerriet op Java', *De Gids* 59: (1895) 1, 283–303.
 55. For instance, De Vries himself carried out simple experiments on the cause of blue spots on Edammer cheese. H. de Vries, 'Over blauwe kaas I, II en III', *Maandblad Hollandsche Maatschappij van Landbouw* 9: (1887) n. 5; idem, IV en V. *Maandblad Hollandsche Maatschappij van Landbouw* 10: (1888) supplement n. 2.
 56. H. de Vries, *Het ringziek der hyacinthen* (Haarlem, 1882). In 1883, De Vries gave a reading to the Algemeene Vereeniging voor Bloembollencultuur, to convince the growers of the benefit of science in combating hyacinth diseases. Archive Hugo de Vries, see: E.J.A. Zevenhuizen, *De wereld van Hugo de Vries* (Amsterdam, 1996) inv. ns 538 and 80). See also: H. de Vries, 'Wetenschap in dienst der praktijk', *Landbouwkundig Tijdschrift* 9: (1893) 217–230.
 57. H. de Vries, 'Bacteriologie in Nederland', *De Gids* 52: (1888) 1 571–591. In 1891, on the initiative of J. Ritzema Bos and H. de Vries, the Nederlandsche Phytopathologische Vereniging was founded. H. de Vries, 'Het Phytopathologisch Laboratorium Willie Commelin Scholten', *Eigen Haard* 22: (1896) 133–136, 149–152.
 58. H. de Vries, 'De levende natuur', *De Gids* 60: (1896) 2 152–154. De Vries was a co-operator of *De Natuur In!*, *Tijdschrift voor het Lager Onderwijs*, that appeared from 1896 edited by the primary school teacher, P. Teunissen. De Vries supported the activities of the Nederlandsche Natuurhistorische Vereeniging, founded in 1901, and was appointed honorary member of this society in 1903. He also supported the work of the teacher and popularizer of nature, J.B. Bernink. See: J.B. Bernink, 'Natura Docet', in: A.F.H. Besemer e.a. eds, *In het voetspoor van Thijssse* (Wageningen, 1949).
 59. H. de Vries, book reviews, e.g., *Album der Natuur* (1897) 42–47; (1899) 220–224, 317–318; (1900) 27–30, 123–126, 283–284; (1903) 406–408; (1904) 145–151; (1905) 367–372. In reverse, amateur biologists most praisingly wrote on De Vries' works. See, e.g. E. Heimans, 'Boekbespreking', *De Levende Natuur* 5: (1900) 45; E. Heimans, 'Professor Hugo de Vries I, II en III', *De (Groene) Amsterdammer* January 19 and 26, February 2, 1913; Jac.P. Thijssse, 'Jubilate', *De Levende Natuur* 32: (1928) 305. In his turn, De Vries was also influenced by the work of amateurs; see, e.g. H. de Vries, 'Boekaankondiging', *Album der Natuur* (1900) 123–126.
 60. J.H. van Burkom, '1848 – 16 februari – 1928', *Natura* (1928) 17–19. See also: Theunissen (n. 5) 'Natuursport en levensgeluk'.
 61. Archive Hugo de Vries, Zevenhuizen (n. 56) inv. ns 537–571, 80–86. At the Society Diligentia many famous speakers appeared, such as Lorentz, Hubrecht, and Ehrenfest. De Vries was in the lead: 18 presentations, 14 courses. R. Claassen and P. Wisse, *Tweehonderd jaar Diligentia 1793–1993* ('s Gravenhage, 1993).
 62. F.J. van Uildriks, 'De Haagsche Cursus van prof. Hugo de Vries', *Dagblad voor Stad en Land*, November 16/17, 1912. De Vries also took lecture material (plates), herbals, etc. with him to America, and beforehand he sent seeds. Archive Hugo de Vries, Zevenhuizen (n. 56) inv.n. 254 and 386.
 63. In 1872, P.A. Haaxman started making reports of the readings; from 1873 they were published as an annual. The quotation referring to De Vries' reading 'Over het inmaken van groenten en vruchten', on February 8, 1879, appeared in *Dagblad van Zuid-Holland en 's Gravenhage*, February 9/10, 1879.
 64. Giving courses was the idea of E.K.G. Rose, after the American concept of 'university extension'. De Vries was the first to give such a course. See: H., 'Hugo de Vries', *De Nieuwe Courant* 16 February 1918.
 65. H.P.G. Quack, 'Levensbericht van mr. G. de Vries Az 1818–1900', *Levensberichten der afgestorven medeleden van de Maatschappij der Nederlandsche Letterkunde* 1900–1901.
 66. Both De Vries' grandfather, Abraham de Vries, and his father and uncle were chosen to join the Maatschappij der Nederlandsche Letterkunde. Quack (n. 65) 'G. de Vries'; Lever (n. 10) 'Genen van Hugo de Vries'.
 67. F.A.F.C. Went, 'Herinneringen aan Hugo de Vries als hoogleraar', *Natura* (1928) 19–21; V., 'Hooger onderwijs. Prof. dr. Hugo de Vries', *Propria Cures* 15: October 10, 1903.
 68. Quotation from: Anonymous, 'De reis van Hugo de Vries in Amerika', *De Nieuwe Courant* 18 October 1912, referring to De Vries' third journey to America where, in a reading, he warned against a worldwide famine and spoke about possibilities

- to improve cultivated plants. See also *De Nieuwe Courant*, November 2, 1912. Archive Hugo de Vries, Zevenhuizen (n. 56) inv.n. 386. About De Vries' prophetic gifts, see also: Blakeslee (n. 4) 'Hugo de Vries'; Cleland (n. 4) 'Hugo de Vries 1848–1935'.
69. *De Nieuwe Amsterdammer*, 11 December, 1915 (cover) and 15 January, 1916, p. 7.
70. *De Nieuwe Courant*, May 5, 1913, review of: H. de Vries, *Van Texas naar Florida* (Haarlem, 1913).
71. De Vries propagated developing of individual, natural abilities in young people. See, e.g. H. de Vries (n. 38) 'Eenheid in veranderlijkheid'. M. Montessori (1870–1953) used De Vries' views on heredity in conceiving her educational method. Afterwards she discussed it with De Vries on her visit to The Netherlands. R. Kramer, *Maria Montessori: a biography* (Oxford, 1978); R.J. Fynne, *Montessori and her inspirers* (London, 1924).