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Was Wilhelm Roentgen a German or a Dutchman? What was his relation to The Netherlands?

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Roentgen's father, the draper Friedrich Conrad Roentgen, was a German born at Lennep, near Cologne, in 1800. His only son, Wilhelm Conrad, was also born at Lennep in 1845. After completing his training at school and at the university, Wilhelm Conrad worked at several German universities as an assistant, later as a private lecturer, and finally as a professor. In Würzburg (Bavaria) on 8 November 1895 he discovered 'rays of a new type' which he called X-rays, and these rays made him world-famous within a few weeks. In 1900 he was appointed professor in Munich, the Bavarian capital, and in Munich he died in 1923 after an emeritus period of three years.

In the light of these facts, could there be any doubt about his German nationality? As a professor in German universities he held an office of State and must have had German nationality. Assuredly this was the case, but nevertheless he was not a German citizen during an important period of his life. He lived in The Netherlands from the third to the twentieth year of his life.

It is on this period of the great physicist's life, and on the relationship he maintained with The Netherlands through many years until his death, that this paper intends to focus attention; and in considering this period and this relationship we shall also come to know and appreciate Roentgen as a person.

Roentgen's mother, Charlotte Constance Frowein, was a Dutchwoman. When she married Friedrich Conrad Roentgen in his native city, Amsterdam, a local daily paper published the announcement at the foot of this page.

The young couple established themselves at Friedrich Conrad's place of residence, but three years after the birth of their only son, Wilhelm Conrad, they decided to emigrate to The Netherlands. On 23 May 1848 Friedrich Conrad visited the Registrar's Office at Lennep and in the presence of the Registrar signed a document stating that, with a view to his intended emigration to The Netherlands, he had surrendered his Prussian nationality.

The family went to live at Apeldoorn (Province of Gelderland), which for almost two centuries had had a special reputation among the Dutch municipalities because it was (and is) the site of the royal residence 'Het Loo'. The King, and in earlier times the Stadtholder, lived in this castle for many months of the year. The residence had been built in the years 1685–89 by Willem III, Stadtholder of The Netherlands and King of England. In Roentgen's days it was the residence of King Willem II (died 1849) and King Willem III (1817–90), whose daughter Queen Wilhelmina (born 1880) died there in 1962.

At that time a foreigner who had been a resident of The Netherlands for six years and had no intention of leaving the country shortly was 'put on equality' with Dutch citizens and granted the same rights and duties, with the exception of the right to vote and to elect (which at that time did not mean much). Therefore the statement that Friedrich Conrad Roentgen's family acquired Dutch citizenship after a few years' stay at Apeldoorn is hardly contestable. And, as such, Wilhelm Conrad had obligations also with regard to the national militia. However, he was never on active military service because at that time the law exempted the only son of a family from conscription. The King's Commissioner for the Province of Gelderland confirmed this in a document which Wilhelm received shortly before his marriage on 24 November


Getrouwd:
F. C. RÖNTGEN
van *Lennep*,
met
C. C. FROWEIN
Amsterdam,
6 Mei 1842.

1871. Naturally, Roentgen also had a Dutch passport, written in the language of diplomacy—French (Fig. 1).

At Apeldoorn young Wilhelm Conrad was brought up by his well-to-do parents like any Dutch boy of his class. When he was 5 years old he was allowed in a small ceremony to lay the foundation-stone of the house his parents were having built. In 1958 this stone—with the inscription 'W.R.C. 22.10.1850'—was recovered in the house at No. 171 Hoofdstraat. Wilhelm, of course, went to school at Apeldoorn, and when he was 17 years old his parents took him to Utrecht, where he was taken into the family of a young, ambitious chemist, Dr. Jan Willem Gunning, who at that time lived at No. 62 Nieuwe Gracht. Gunning was a lecturer in the University of Utrecht and also on the teaching staff of the technical school, a private institution of secondary education. Roentgen attended this school and proved himself an excellent pupil. The seven progress reports he received at this school can only be described as exceptionally good. In subjects like geometry and stereometry, for example, he never had any marks lower than 'very good' or even 'excellent'; in chemistry, the subject taught by Dr. Gunning, his marks were never other than 'good' or 'very good'. Only in physics were his marks sometimes less good. The first winner of the Nobel prize in physics sometimes received marks not exceeding 'reasonable' and occasionally even 'moderate' and 'very moderate'; his final report of 3 May 1867 in fact marked him 'very poor' in this subject. In no other report and no other subject had he ever had so poor a mark.

It must have been at this school that Wilhelm refused to report a friend who had drawn a caricature of a teacher on the screen surrounding the stove; when the friend did not reveal himself as the perpetrator, Roentgen took responsibility for the offence and was given the severest punishment the school could possibly impose—he had to leave the school for good. This must have happened about two months before he would have completed the two-year course, and this explains why only seven progress reports instead of eight are available. Apparently even his fatherly friend, Dr. Gunning, was unable to prevent this catastrophe. On the other hand, the importance of this punishment to Roentgen must not be exaggerated: the technical school had no final examination and Roentgen's excellent progress reports warrant the conclusion that he derived the full benefit from this two-year course.

At that time Dr. Gunning advised his young friend to refrain from returning to his father's drapery at Apeldoorn but to take lessons in Latin and Greek instead in preparation for a matriculation examination of the University of Utrecht. Those who had not passed a final examination at a 'gymnasium' (training college) recognized by the state could gain admission to a university by passing such an examination. An entry in the state archives at Utrecht on 14 January 1865 shows that Roentgen took this examination . . . and failed! Four days later he nevertheless registered, but not as a student: as an auditor he started to attend lectures in stereometry, analytical geometry, physics, botany, zoology, logic, and Latin and Greek.

Early that year Dr. Gunning had to move to Amsterdam, where he had been appointed professor of chemistry.

This event certainly made a deep impression on the young student, who at that time achieved something unusual: he wrote a treatise entitled 'Questions concerning the inorganic part of Dr. J. W. Gunning's textbook of chemistry'. It is a neat little book of 58 pages, with some 1,000 questions without answers. Its purpose is clearly explained in the preface:

> 'The intensive use made of Dr. J. W. Gunning's Textbook of Chemistry as a guide to the initial study of this science, and the many peculiar difficulties I have noticed when attending an institution where chemistry is taught, suggested to me the idea of compiling a brief scheme which might also be used as a repertory. For it seemed to me that the principal difficulty for many young people lies in the fact that they confuse the various substances and actions. . . .
> 'May this publication, rather than doing a disservice either to Mr. Gunning or to the study of this splendid science, contribute to its better understanding and appreciation.'

At the end of that year (1865) Roentgen changed his study plans, and made a decision which was to be of the greatest importance for the rest of his life. Apparently he regarded his chances of passing the matriculation examination at a second attempt as slight, and he knew that the Polytechnikum in Zürich accepted students without complete college training. In Zürich Roentgen managed to obtain a diploma in mechanical engineering within three years; and within another year he had written a thesis entitled 'Studien über Gase' which earned him a doctor's degree.

During these years it was undoubtedly still his intention to return to his 'fatherland', The Netherlands, for he wrote a request to King Willem III

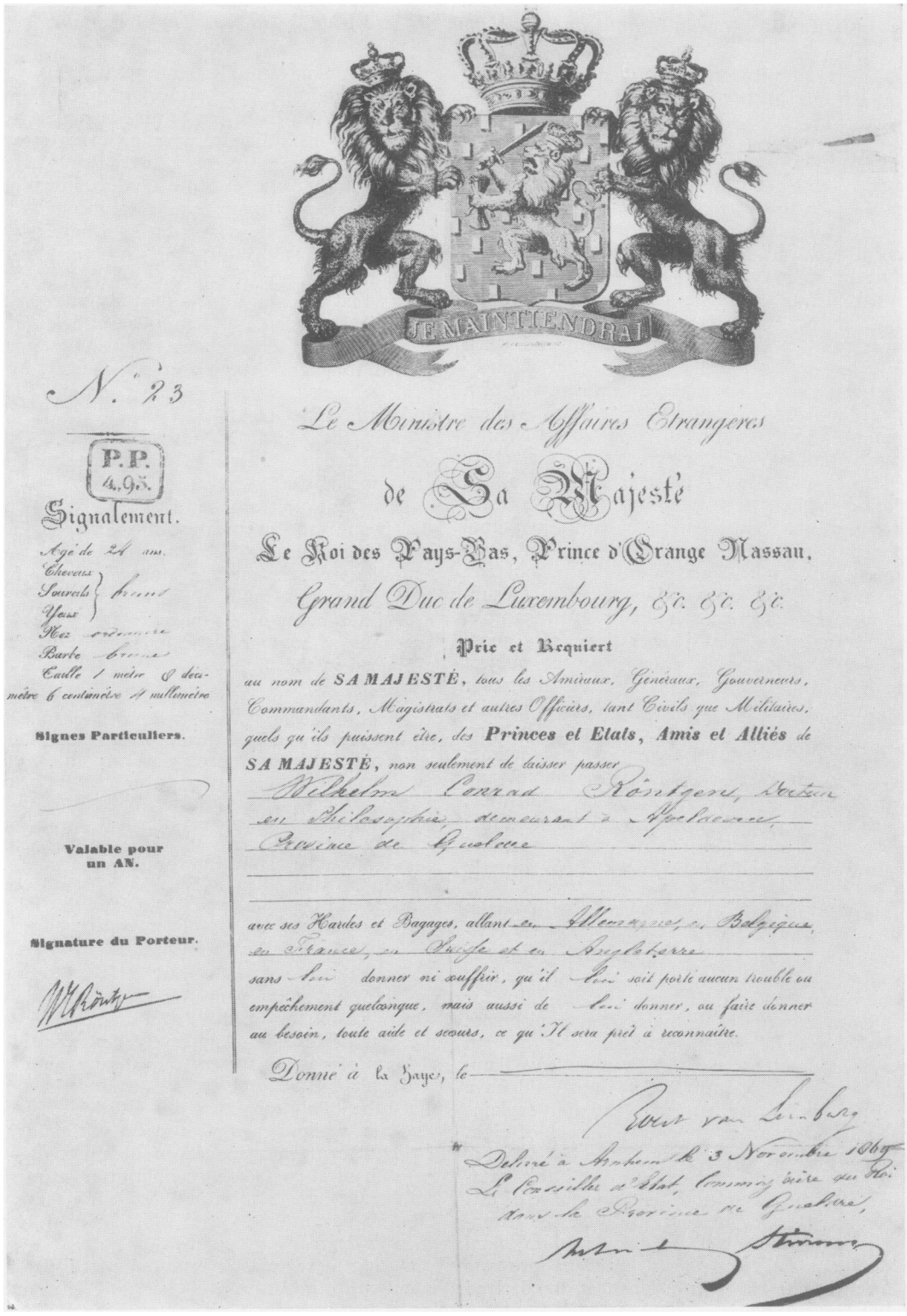
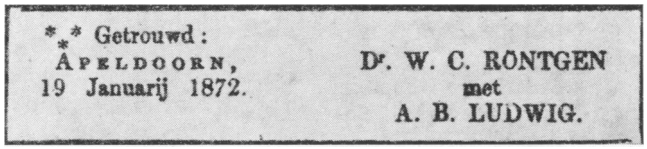


FIG. 1. *The Dutch passport of Wilhelm Conrad Roentgen.*

in which he asked, on the basis of his Dutch secondary school education and his Swiss engineer's diploma, to be granted authority to teach at Dutch secondary schools. On 9 June 1869 the King did in fact grant him this authority. Perhaps Roentgen had in mind his fatherly friend, Dr. Gunning, who had been a teacher first, then a lecturer, and finally a professor. However, Roentgen never made use of the teaching authority he was given.

At that time he became assistant in physics to Professor A. Kundt, first in Zürich and subsequently in Würzburg. In 1872 he returned for some time to The Netherlands, where his parents were still living. On 19 January 1872 the burgomaster of Apeldoorn performed the ceremony of his marriage to a Swiss girl, Anna Berta Ludwig. This marriage, which lasted 47 years and was a very happy one even though there were no children, was solemnized in the Dutch Reformed Church by the Rev. C. F. Gronemeijer. The Apeldoorn newspaper published the following announcement:


_ Getrouwd:
APELDOORN,
19 Januarij 1872.

Dr. W. C. RÖNTGEN
met
A. B. LUDWIG.

With his young wife Roentgen soon returned to Würzburg, whence he moved to Strasbourg with Professor Kundt; in 1873 his parents also came to Strasbourg. At the age of 30, in 1875, he was appointed professor of physics; and this must have been the moment when he gave up his Dutch 'citizenship', because he entered the service of the German state. However, he retained throughout his life an interest in The Netherlands and his loyalty to Dutch friends and relatives.

In 1888, after nine years as an ordinary professor of physics at the University of the State of Hessen, in Giessen, Roentgen had an opportunity to return to The Netherlands. In that year his former teacher, Professor Buys Ballot, reached the age of 70, and the Board of Governors of the University of Utrecht tried to persuade Roentgen to become Buys Ballot's successor. However, despite the favourable offer of the Governors and despite emphatic requests by Professor Buys Ballot himself, Professor Oudemans, president of the faculty of mathematics and physics, and Professor Engelmann, a German professor of physiology in Utrecht, Roentgen did not accept the invitation. Certainly his reasons for refusing are not to be found in disagreeable memories of the Utrecht school and his failure to matriculate, but must be ascribed to his wife. She had no knowledge of the Dutch language, and was understandably reluctant to settle in Utrecht. Roentgen himself would not have had the slightest difficulty in this respect; he could easily have given his lectures in Dutch, as he indicated politely in his German letter to the Board of Governors.

'Finally, allow me to offer the Governors my apologies for using the German language in this letter. It is because I fear that I might use some germanisms in these lines that, against the rules of courtesy, I refrain from using the Dutch language. I may add, however, that this fear is perhaps exaggerated, for in my parents' home the Dutch language was the medium of ordinary conversation until my mother's death three years ago.'

Instead of Utrecht it was in Würzburg, where he had lived before, that Roentgen in 1888 accepted an appointment as professor of physics; and it was in Würzburg that he wrote his publication *On a New Type of Ray*, which on 28 December 1895 astounded the world. All over the world the notion that it was possible to obtain on a screen the moving image of the bones of a living human being created a sensation.

Among those who received a reprint of Roentgen's paper was Hendrik Anton Lorentz, professor of theoretical physics in the University of Leyden. He thanked Roentgen in the following letter:

Leyden, 21 January 1896

Esteemed colleague:

Please accept my sincerest thanks for your kindness in sending me your important publication, and for the splendid gift attached to it: the marvellous photographs obtained with X-rays. Like all our colleagues here, I rejoice in your brilliant discovery, which opens up a new field for science. It is my fondest hope that you may succeed in elucidating the nature of these enigmatic phenomena; but even if that should prove to be impossible, science would nevertheless owe one of its most important triumphs to your work.

With my best regards I remain,

Truly yours,

H. A. Lorentz.

Four days later Lorentz discussed Roentgen's discovery at a meeting of the Royal Academy of Sciences in Amsterdam, and showed the *x*-ray photographs which Roentgen had sent him. He wrote about this meeting to Roentgen, and the proceedings of the Academy make mention of the discussion and Lorentz' demonstration.

When in 1901 Roentgen was the first physicist to receive the Nobel prize, Lorentz sent him his congratulations, and Roentgen was so touched by this gesture that he wrote Lorentz a letter of thanks in the Dutch language:

Munich, 22 December 1901

Esteemed colleague:

Many thanks for the kind words you sent me—words which fill me with great joy and not a little pride because I hold their author in such high regard. There is indeed a great difference in value between the noisy approval of the crowd and the simple words of an eminent man of learning. I hope, and I trust, that neither form of approval will make me vain!

With my sincerest compliments I have the honour to be,

Yours truly,

W. C. Roentgen.

In the course of the next few decades the two world-famous scientists (Lorentz was awarded the Nobel prize in 1902) met regularly and kept in touch by correspondence. When Roentgen celebrated his seventieth anniversary in 1915—during World War I—Lorentz sent his congratulations, and, in his note of thanks, Roentgen mentioned his memories of youthful days in The Netherlands:

'. . . and the fact that these wishes came from The Netherlands, the country I owe so much and where I spent happy early years, enhanced their value to a considerable extent. . . .'

He gave expression to fond memories of his youth in The Netherlands in an official letter on 22 May 1907 to Professor J. D. van der Waals, Dutch Nobel prize winner of 1910, who as secretary of the Royal Academy of Sciences in Amsterdam had informed him that the Academy had appointed him a member:

'. . . Also I should like to point out that it gave me particular pleasure to hear of my appointment as a member of the Academy of the country where I spent 17 years of my youth, which to me has been a second fatherland and to which I owe so much in so many ways. . . .'

Professor Kamerlingh Onnes, Dutch Nobel prize winner of 1913, was likewise among Roentgen's Dutch friends, and a number of Roentgen's letters to him have been preserved. In 1899 Roentgen, again in Dutch, expressed his thanks after receiving a copy of *Communications from the Leyden Laboratory*, edited by Kamerlingh Onnes.

While Roentgen was assistant in physics to Professor Kundt in Strasbourg he befriended a young Dutch physicist, Herman Haga. Haga later became professor in Groningen, and the two physicists kept up an intensive correspondence after the discovery of the X-rays. As early as 1899, Haga informed Roentgen that, according to his experiments, the wavelength of the X-rays ought to be between 0·1 and 2·5 Ångström units, 'so that the designation "X" for the roentgen rays retains only historical significance'. This passage shows that Haga had approximately determined the wavelength of the roentgen rays 13 years before M. von Laue!

Another of Roentgen's Dutch friends was Hugo de Vries, Amsterdam professor of botany, who in 1901 published his renowned work *Die Mutationstheorie*. The two came to know each other when both were assistants in the University of Würzburg in 1871. In 1897 Roentgen asked de Vries to come to Würzburg to succeed his former teacher, Professor J. Sachs, but de Vries did not accept this invitation.

When in the early days of the year 1896 all daily papers and journals on physics, medicine, technology, and photography published the sensational news about the X-rays, Roentgen received many congratulations from The Netherlands also. His cousin, Caroline Frowein, who had married the notary public, W. Fischer, at Ede (Gelderland), had read in the daily papers 'that you have made such a wonderful discovery. Well, my dear Willem, this does not surprise me. Even as a child you used to lie awake at night, pondering what we ordinary ignorant people believed to be impossible things. My heartfelt congratulations on your success in obtaining such a brilliant result. . . .'

Many relatives of Roentgen's father lived in The Netherlands also. One of them, the painter Louise Constance Adrienne Roentgen, drew a pastel portrait of the great physicist when he visited her parents in Deventer (Fig. 2).

Among the many letters Roentgen received from The Netherlands after his discovery, the one from his former fatherly friend and teacher, Professor Gunning, of Amsterdam (Fig. 3), held a very special appeal for him:

Amsterdam, Andrieskade, 9 February 1896.

There are X-rays also in the human heart, which steadily illuminate what time and space tend to obscure. You and your kind parents continue to live in our memory, and it is seldom that a 27th of March (that is Roentgen's birthday) passes without our

thinking of you. We take great pleasure in assuring you of this now that we have reason to send you our special congratulations. May that which you have given the world, and which will keep your person visible even in the obscurity of the future, enhance mankind's good fortune in spiritual as well as in material terms.

Your friends of Nieuwe Gracht/Schalkesteeg,
Prof. J. W. Gunning and P. A. Gunning-Pierson.

The letter in which Roentgen replied to these congratulations is among the finest he ever wrote. Written when he had reached the peak of his career, it also symbolizes the height of Roentgen's relationship with The Netherlands.

Sorrento, 1 April 1896

Esteemed Sir and Friend:

Among the many surprises and congratulations I have recently received, there was hardly one so valuable and fond to my heart as the one you sent me. Your words are proof to me that you are still thinking of me in friendship, although by my behaviour in recent years I have forfeited my right to expect this. Many times I have thought: if only I knew that the old friendship is still strong enough, I would write: *Pater, peccavi.* Take me into your heart again. I have wanted to write you that your place in my heart has never been empty, and that I have never forgotten what I owe you both.

FIG. 2. *Portrait of W. C. Roentgen, drawn by L. C. A. Roentgen in Deventer.*

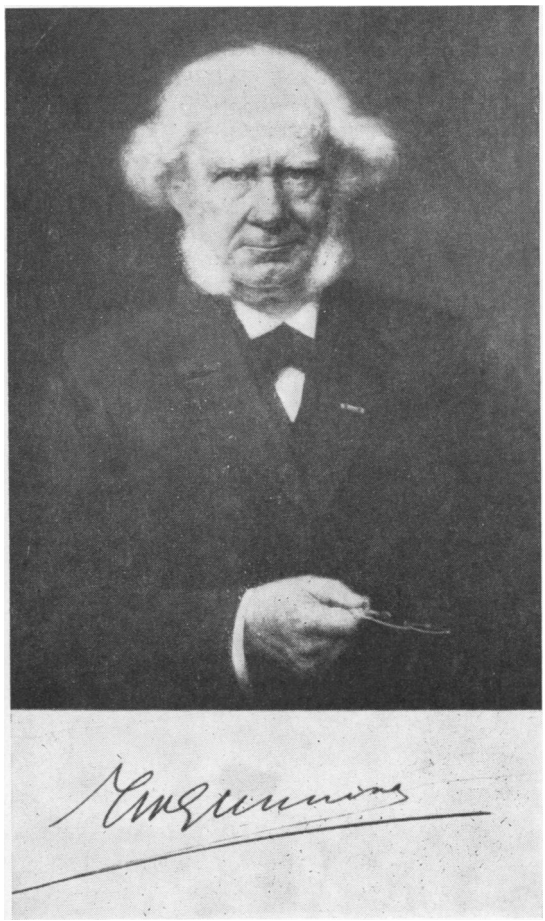


FIG. 3. *Portrait of Professor Dr. Jan Willem Gunning.*

It grieves me to know that my dear, unforgettable parents, who were so proud of their son, are no longer alive to witness my success. But my heart rejoices in gratitude at the thought that the dear people, who, after my parents, exerted the greatest influence on my upbringing and in whose house I spent so many years as if I were their child, may now know that their love and also the concern they have felt for my sake have not been entirely futile. I do not wish to write down in detail all that I have to thank you for, but please be assured that I have not forgotten even the slightest of these many things. . . .

It would give me great pleasure if I might receive more detailed and more exhaustive information about you and yours. Perhaps you could find a little time for a further message when the opportunity presents itself.

Esteemed Sir and friend, let me once more assure you and your honoured wife of my sincerest gratitude

for your interest and your kindness in re-opening our correspondence.

With the most cordial compliments from my wife and myself to you and your dear family I am,

Your grateful W. C. Roentgen.

It is difficult to conceive of a contrast greater than this: while the daily press and the journals of many branches of science hail the success of a great physicist who has suddenly attained world-wide fame, Roentgen tenders his apologies with the words from the Gospel According to St. Luke: *'Pater, peccavi'*.

It is likewise difficult to conceive of a greater harmony between the pinnacle of scientific achievement—the discovery of the roentgen rays—and the highest of human motives—gratitude towards parents and teachers.

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