

Pioneers of electricity in Rotterdam

by Jan van den Noort

In the last three decades of the nineteenth century, Rotterdam took the first tentative steps on the path of electricity supply. Although the phenomenon of electricity had been known for some time, it had not yet been applied on a large scale as a source of light or to drive engines. The many inventions that followed each other in rapid succession, enabled the use of electricity; the steep decrease in cost brought it within the reach of many.

Hotel Leygraaff at Westplein, Rotterdam was one of the first. The owner of the hotel was in the fortunate possession of a dynamo and an arc lamp and with them he lit the hotel garden as early as in 1878. With such an installation only one arc lamp could be lit at first and besides this, the lamp had to be suspended near the dynamo.

The transport of electricity through a cable was only in its infancy and the cord could not take the light much further than some ten metres. Against this background it was obvious that the electricity consumer took the production of electricity into his own hands; after all, there were no central power stations. The light was satisfactory, attracted much attention and was highly admired.



Private initiatives in Rotterdam 1878-1895. The map shows the concessions granted by the municipality between 1878 and 1895. The article focuses attention on two early initiatives.

The developments in technology followed each other in rapid succession. At the moment the people of Rotterdam were admiring Leygraaff's lamp, the technique which was applied there was in fact already obsolete. In the same year Leygraaff installed his lighting installation (1878), the Russian Jablochhoff surprised the world, on the occasion of the Paris Electricity Exhibition, at Avenue de l'Opéra, by simultaneously lighting up 32 arc lamps. The Compagnie Générale d'Electricité promoted these 'Jablochhoff candles' and achieved success far beyond the French border. The introduction of the Jablochhoff candle was an important step ahead and contributed much to the generalization of electric light. Arc lamps produced a bright light which made them very suitable for search lights, light houses and street lighting. The weaker gas light, however, was better suited to the needs of interior lighting.

Because of the invention of the incandescent lamp in 1878, all this changed. This lamp, a glowing wire in a glass bulb, produced weaker light and was much cheaper into the bargain. The invention was claimed by many people of whom the best known is Thomas A. Edison. His incandescent lamp especially became well-known in Europe by the Paris Electricity Exhibition of 1881.

Because of Jablochhoff's invention it was possible to light more than one lamp on one dynamo, but already a couple of years later Jablochhoff had to face keen competition from the incandescent lamp. This lamp was so cheap that installations with more than one lamp were not only technically but also financially possible. Thanks to Jablochhoff it became possible to build central power stations, but thanks to the incandescent lamp they would mushroom. In 1882 Edison increased his fame by opening a central power station in New York.

The Paris Compagnie Continentale Edison represented Edison in continental Europe. In turn the Parisian company was represented in the Netherlands by NV Nederlandsche Electriciteits Maatschappij (NEM) in Amsterdam.

On 7 August 1882, some weeks before Edison had opened his central power station in New York, the NEM asked Rotterdam for a municipal permit to 'build one or more stations for the production of electricity, for the lighting of buildings, houses etc. and to be allowed to lay electric cables in municipal ground'.

Squabbles in the Town Council could not prevent the NEM from obtaining the permit. However, some phrases were added to the permit: 'to perform experiments' and 'in any case until further notice'. This was done to emphasize the temporary nature of the Municipal cooperation.

A member of the Rotterdam Town Council summarized the intentions of the NEM briefly and to the point: 'A big machine is coming from America and with it they think to prove that electric light really is cheap'. If the NEM should be capable of constructing a central power station, run it and make its product affordable, it would obviously be considerably ahead of all those electricity companies that had to set up installations in each separate house.

The 'big' Edison machine the NEM had in mind for Rotterdam, was mainly regarded as a publicity stunt. The power plant, established at 34 Baan, was tested on 18 December 1883 and the next night it began with the supply of electricity. This made the Baan power plant the first central power station in the Netherlands.

In the NEM plant there were three, twenty horse power steam engines driving four Edison dynamos. In their turn these dynamos could light a thousand Edison lamps; in those days a considerable installation. From this Baan plant a thick, expensive cable 'entirely closed in close-fitting iron pipes' ran to Passage at Coolvest which was some two hundred metres away. Here the cable was connected to the installations of the Grand Café du Passage and to some shops, including a tobacconist, a confectionery and an umbrella shop.



Passage at Coolvest

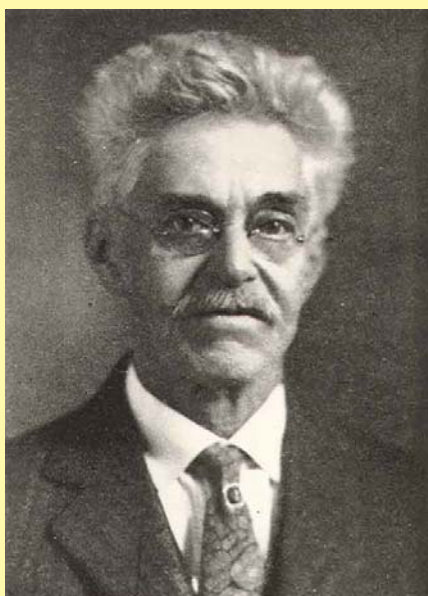
The Grand Café du Passage in particular, where 172 incandescent lamps were fitted, attracted much attention. One of the journalists present was very pleased with the lamps over the reading table, which were 'very effectively' fitted, 'as the light shines down from the chandelier instead of up... The light comes down beautifully on the reading table and we should almost advise the contractor of this establishment to fit the lamps over the billiard table in the same direction'.

At the time people were so accustomed to gas light that a comparison between gas and electric light was obvious. Flickering, smoking gas flames had the great disadvantage that the temperature in the pub rose considerably and that the air became foul. Yet there were also opponents to electric light who thought that because of the higher temperatures gas light provided a better ventilation.

Those in favour and against opposed each other in all sorts of ways and it was by no means always clear if it was a case of conviction or interest. After two months the cable of the NEM was 'wantonly' vandalized. This cable not only lay in municipal, but also in private ground and it was a dispute with one of these private citizens that led to the incident. The NEM was forced to divert the cable through municipal ground and to do so it needed the permission of the Municipality. However, there was considerable cooperation on the latter side, so that one month later there was light again in Passage.

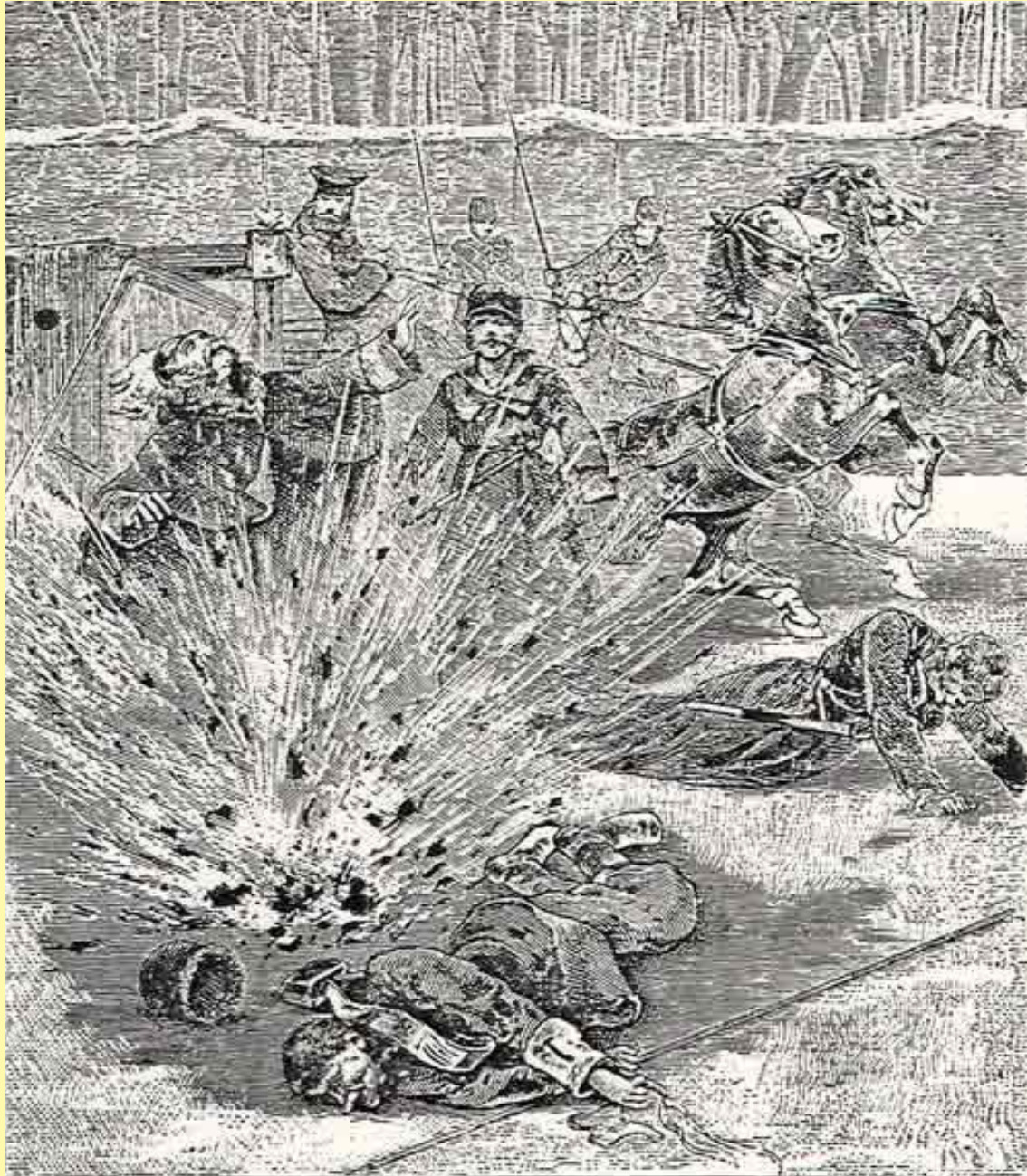
For a young company, balancing on the verge of profitability, such incidents could be fatal. Besides, the interest in being connected to the central power station appeared to be too little to be able to continue the operation for a long time. The cost was too high, the profits too insignificant. Three months after the diversion of the cable, the NEM decided to stop the experiment, 65,000 guilders and an illusion poorer. Again the NEM asked permission from the Municipality to break up the streets, this time to dig up the one-year-old cable. In Amsterdam the NEM made great efforts to obtain a permit, but to no avail. In 1892 the NEM Board decided to go into liquidation and paid 6 guilders and 70 cents for each 250-guilder share. In the early years many other electricity companies went bankrupt in a similar way, for the profit margins were small and the risks considerable.

By far the most important private initiatives in the field of the Rotterdam electricity supply were taken by the Electriciteitsmaatschappij Systeem 'de Khotinsky'. The Russian Achilles de Khotinsky started his inventive career in the Navy. He designed electric detonators for torpedoes and mines and provided the Russian army with search lights, so that the enemy could also be shelled at night.



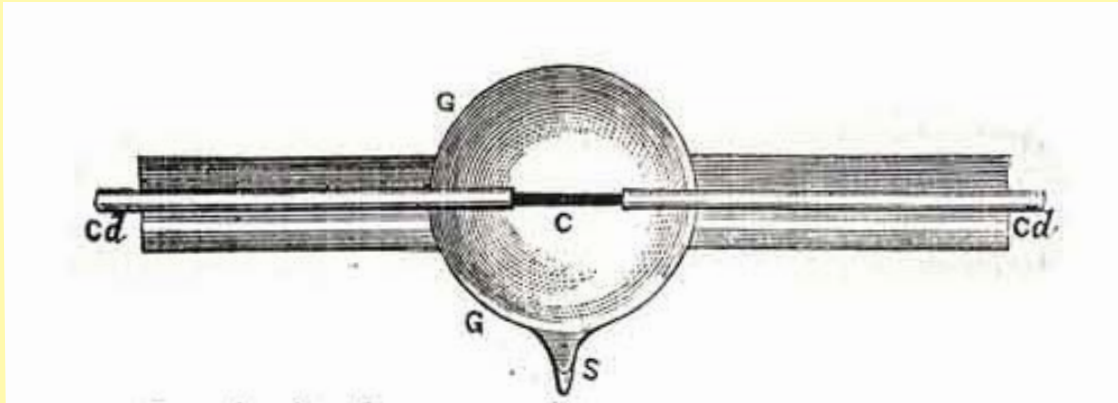
Achilles de Khotinsky 1850-1933

Apparently he was so adept in experimenting with detonating mechanisms, that he was accused of the successful bomb attack on his employer Czar Alexander II (1881). De Khotinsky, however, who meanwhile had left for Paris, resolutely denied the accusation.



Attack on Czar Alexander II in 1881

His experience in the Russian Navy enabled him to develop a very usable accumulator from electric detonators. Together with an incandescent lamp invented by him the accumulator formed a complete installation for electric lighting; so there were no complicated electric mains or distribution systems, just an accumulator and a lamp.



Experimental lamp De Khotinsky (1872)

C = carbon rod, Cd = electrical conductor, G = vacuum glass ball, S = fusion point

With his inventions De Khotinsky visited electrical engineers of repute, hoping that they would recommend his system. In Paris he found a committee that was not inclined to stare at his lamp for three hundred hours and found it necessary to decrease this time by increasing the voltage. They concluded that the lamp lasted for just five hours and forty minutes which was too short for a recommendation. De Khotinsky could pack up his handy all-in-one lighting and go.

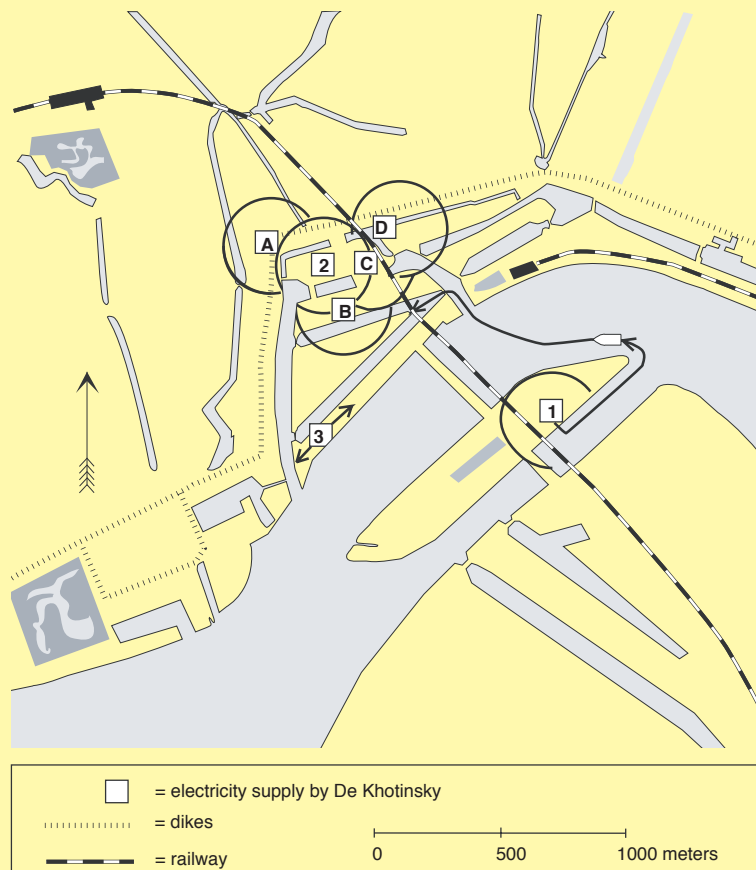
In England the Director of the Telegraph Company examined De Khotinsky's accumulator and was so content with it that he provided the inventor with a recommendation for the Director of the Edison factory in London. De Khotinsky signed a contract with this manufacturer and continued to work on his accumulator for some months until he discovered that the manufacturer had not enough capital available to take it into production.

Next De Khotinsky came into contact with the Rotterdam coffee merchant Wilhem Schöffer, who showed much interest in his inventions. In November 1883 the inventor gave a demonstration of his abilities by electrically lighting his host's dining hall. Schöffer was very much impressed by this and suggested to the inventor to build a factory for accumulators and incandescent lamps with him and some other people from Rotterdam. This time De Khotinsky looked before he leapt and negotiated for five nights, lighted by his own system, about the ins and outs of the contract. The result was the foundation of the Electriciteitsmaatschappij 'de Khotinsky'.

All this did not escape the attention of the local papers: 'Tonight the light performed excellently, not in the least owing to its invariably continuous brightness.' They enthusiastically reported on the plans for a factory: 'In the factory the accumulators are filled. Next they are transported to various houses where they are placed in a cellar or some dusty corner. From here a certain number of houses could receive electric light by means of a wire running through a wall or window frame. Depending on the number of users and the quantity of light in these areas, more or fewer accumulators are placed, but since they are so small, a very small space suffices for a larger number. To all this is added that along the wire from an accumulator the necessary motive power for smaller machines can be obtained, so that, for instance, sewing machines and various industrial appliances could be operated on it. It is also very convenient that when anywhere neighbours make use of the enterprise, everything can be arranged indoors and the company does not need a concession from the Municipality to lay cables in public ground.'

The densely populated town offered too little space for a factory so it was decided to construct the building on the other side of the Maas, on Noordereiland. This first Dutch accumulator and incandescent lamp factory included a power plant and was finished in less than eight months. Less than a year after his first contact with the coffee merchant Schöffer, De Khotinsky could show press and visitors round his new factory at Prins Hendrikkade. The tour included the boiler house and the 150 h.p. steam engine which drove, among other things, a large Edison dynamo. The dynamo was capable of providing electricity for twelve hundred lamps. This was too much for those few customers who could be found on Noordereiland at the time. Mayer's factory of gas engines, situated on Maaskade, was connected to the Noordereiland plant by means of a cable. It was one of Achilles' first clients.

De Khotinsky's accumulators offered the possibility to increase the plant's range of action. De Khotinsky asked for and obtained permission from the Municipality to lay a cable from his factory on Noordereiland to the waterfront. The inventive Russian also obtained permission to lay a cable near some warehouses at Wijnhaven. De Khotinsky then mounted a few big accumulators in a small boat. With the aid of the dynamo and via a cable he provided the accumulators with sufficient electricity and at nightfall he sailed across with the accumulators. Having arrived there he attached them to the cable connecting the quayside to the warehouses at Wijnhaven, and in this original way he lighted Rotterdam's business centre. If he should not have been frustrated, Rotterdam would have profited even more from his pioneering.



Electricity supply by De Khotinsky

De Khotinsky was not very content with the transport of the accumulators. Especially in stormy weather the crossing with the 'electricity keepers' was a hazardous enterprise. After some time the boxes with the sloshing acid began to show defects. Therefore De Khotinsky was looking for a place nearer the town centre. He bought premises between Blaak and Hoogstraat, at Zijl and asked the Municipality for a permit to lay cables from the premises to four 'accumulator stations' scattered about the town centre. From these permanent accumulator stations he could light the entire town centre. The thought seemed very attractive, but the Municipality had other views.

The Councillor J. Hudig made use of his right of interpellation and expressed the feelings of his fellow Councillors when he said that he was convinced that 'now the Municipality provides gas, it also should be responsible for the provision of electricity. ... The moment to make proposals has yet to come, but at the moment the gasworks is finished and I am still a Councillor, I intend to make a proposal to that effect'.

Less than one year earlier the Municipality had decided to run the gas provision itself. It bought a gasworks and the Municipal gas provision began on 1 January 1884. Once the Municipality of Rotterdam produced gas, it was not inclined to give such a dangerous competitor as electricity a leg up, let alone in the middle of town. All the stops were pulled out to thwart the initiatives of private electrical engineers.

The Director of Municipal Works nicknamed 'Bold Gerrit' De Jongh contributed major part of the battle against the private initiative. In his advice to the Municipal Corporation he wrote: 'Electricity is still too much in a stage of development to establish an electricity company. Let us bide our time and not pay dues for others. ... Therefore, as soon as the extension of the Municipal Gasworks has led to a production of 20,000,000 m³, I should like to test, on a modest scale, the appliances for electrically lighting, for instance, the Academy building, after which those who live nearby can choose whether they would like to be connected or not.'



'Bold Gerrit' De Jongh (1845-1917)

De Jongh's relentless attitude forced De Khotinsky to come forward with more moderate plans, plans that were less of a threat to Municipal gas light. He suggested to build a very small plant at Boompjes, to show that his system would work and deserved more cooperation from the Municipality. On 2 April 1885 the Town Council decided to grant De Khotinsky a permit to light 'temporarily, until further notice, as a trial', part of Boompjes.

But De Jongh continued to frustrate the plans of the pioneer in electricity. The cables had to be laid 5 metres from the pavement so as not to hinder the gas pipes that would be laid just along the pavement. This did not exactly decrease the distance from the main cable to the customer and in view of the high cost involved, a protest was in order. Without success though: 'I am honoured to suggest that the interest of the Municipality do not allow another place,' De Jongh wrote. If De Jongh's demand 'every cable in a separate pipe' was taken up by the Municipality, the price of the cable network would have been still higher. The Town Council, however, accepted De Khotinsky's proposal to lay the cables in wooden cases measuring 40 by 15 centimetres. This solution was then considered very modern. De Khotinsky had to pay cable tax for the use of Municipal ground and De Jongh saw to it that the dues were so high that the company suffered from a form of permanent anaemia. As a result the chances of expanding the company were slim.

In March 1885 the central power station at Boompjes could be festively opened. It lighted, for instance, the offices of Schöffer and the Rotterdamsche Bank. In all, the plant could light three hundred lamps. It was quite an achievement, but it would take more to conquer the world market.

It was obvious that De Khotinsky did not have a ghost of a chance to electrically light a larger part of Rotterdam. For this reason De Khotinsky shifted his sphere of activity to Germany. His decision to take up the thread elsewhere was predominantly prompted by the Municipal opposition. In addition the high German import duties were a hindrance for the young entrepreneur. Therefore, the production of accumulators was transferred to Cologne and the incandescent lamps would, from then on, be manufactured at Gelnhausen (1888). The Electriciteitsmaatschappij Systeem 'de Khotinsky' kept its nominal seat in Rotterdam, but in 1892 it too was transferred to Gelnhausen.

De Khotinsky left Rotterdam, but the central power station at Boompjes remained in operation until 1895. In this year the users were connected to the Municipal central power station. The users' enthusiasm made it possible for the Boompjes plant to function for another ten years. For, 'if it were not for the fact that it was run at the expense of the common account of the users, this institution would have been abolished long ago', thought the Director of Municipal Works, De Jongh. 'They have been so much accustomed to the electric light, that they do not want to part with it.' He did not mention the fact that he had gone to great lengths to nip the plant in the bud. Both from a technical and financial viewpoint the De Khotinsky plan had more potential than the Municipality would care to admit.

Jan van den Noort,

© Rotterdam, 1 October 1992

Lecture held at the 56th General Assembly of the International Electrotechnical Commission in Rotterdam

Letters to the Editor

Sir,

On 11 December, last year, my employee, who was ordered to close up for the evening, found it impossible to close the gate of my yard because the earth had been dug up and a number of men were busy laying pipes in the ground. When I inquired about their activities, I was told that it concerned the pipe for the electric lighting for Zuid-Hollandsch Koffiehuis. I told them to stop working and to send for one of the Managers of the electricity company.

Mr Graue made his appearance and was very sorry to have been misled, and promised me the work would not to be continued until my demand had been met, that is to say I protested against this illegal action; however, to prove that I would not hinder progress, I consented to them laying the electric cable as far as Zuid-Hollandsch Koffiehuis, on the condition that I would receive from the owner a certificate stating that I, until further notice, granted permission to allow the electric pipes in my ground.

The next day Messrs. Kanters, Graue and an English civil engineer appeared declaring that they were willing to give me the certificate, but that it was to include the Passage Maatschappij. To this I disinclined in view of the evident over-confidence and the rather improper behaviour of the gentlemen mentioned, and I forbade them to continue. I had been too late, however, in noticing the shrewd dealings of both the Elektrische Maatschappij and the Passage committee, because at night the electric light in Passage was on that notwithstanding my prohibition, they had dug my property using violence and burglary. As a result I summoned the Maatschappij. I gave them two months to meet my demands. But what happened? When the sewage system of my building and warehouses was repaired, the workmen found an iron pipe. Knowing nothing about any pipes, since there could be neither gas nor water mains in my yard, the pipe was broken up and it appeared to be an electrical pipe.

Upon this Mr van Wijk appeared, who tried to scare me using lofty words and ordered his men to repair the mains. I, on my part, however, could not accept such ill-mannered behaviour and defended my yard. Mr van Wijk, however, did not seem to be inclined to respect my rights and told me he would use force and violence: 'If you have 10 men, I shall bring forty.' Indeed a nice idea of ownership, dispelling someone from his property with the aid of hired fists, and this in the Netherlands of all places.

Fortunately the police arrived and I let myself be persuaded to be calm; otherwise there would have been the devil to pay for the consequences. By order of the police I had to accept that the men, under the command of the mentioned Mr van Wijk, repaired the mains. I and many others too still do not know what prompted the police to act as they did, but I acquiesced. A truce was ordered and the Police Commissioner desired, both from Mr van Wijk and me, that we were to show proof of property to the honourable gentleman. This was not difficult for me, but it was for Mr van Wijk, who consequently, after having been requested for days, failed to do so. Some days later I received a request from Mr Havelaar LL.M to call upon him and the honourable gentleman offered me, on behalf of Passage Maatschappij, a sum of Dfl. 150 rent per year if the mains could stay where it was. After all that happened this was too much for me; it was not the money that counted, but justice and to prove that I did not desire any money but justice I demanded something of which I knew that Passage Maatschappij could never grant, even if you are of the opinion that the rights of others can be violated by means of money.

After a few days I became convinced that my demands had the desired result since Mr Havelaar LL.M informed me that the Passage Maatschappij could not agree to my proposition and that the mains would be removed from my ground. After some days, I ordered the Passage Maatschappij to remove the mains, which it did.

This is my question: how is it possible that after so much uncalled-for over-confidence, violation of other people's property, by burglary and after threats of violence, and after being morally compelled to agree to this violation, there is still talk of envy and malevolence? Indeed, any right-minded citizen will strongly condemn this, and agree with me who desired nothing but to maintain my rights.

Much as I should like to further progress, I shall continue to defend my property against violence and burglary.

Thanking you for the granted space, I remain sincerely yours,

Your humble servant,

T.A. Munnig Schmidt, Company Schmidt Boneski

Rotterdam, 8 March 1884

Source: Nieuwe Rotterdamsche Courant of 9 March 1884