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The history of the peat manufacturing industry in The Netherlands: Peat moss litter and active carbon

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SUMMARY

This article describes the development of three major forms of peat processing by the manufacturing industry in The Netherlands since the last quarter of the 19th century. At a time when peat as a fuel was gradually being replaced by coal, the first form was the peat moss litter industry. Peat moss litter was made from white peat that was ground and sieved in factories which were located mainly in bog areas in the south-east of the province of Drenthe. It served as excellent bedding for horses and cattle. The second form of industrial peat processing was the manufacture, from 1921 onwards, of active carbon made from black peat. The Purit (Norit) factory, now part of the Cabot Corporation, is still the only active carbon factory using peat as a raw material. The third form of peat processing was the production of garden peat and potting soil. This is still a widespread activity in peat areas all over the world.

The peat moss litter industry thrived from the 1880s until shortly after the First World War. The arrival of the horse-drawn tram in all of the major cities of Europe created a great demand for animal bedding to be used in the vast stables of the tramway companies. Peat moss litter was cleaner, healthier and easier to handle than straw. There was similar demand from the armies, which used millions of horses during the First World War. Owing to the development of motorised vehicles, the peat market collapsed after the war and this plunged the industry into a prolonged crisis which was not overcome until peat was found to be a suitable growing medium for horticulture in the 1950s.

Living and working conditions in peatlands were harsh, earnings irregular and labourers' rights limited. The peat manufacturing industry was the first to introduce collective labour agreements, medical benefits and pension plans. Nonetheless massive unemployment, poverty and the necessity to migrate to other parts of the country were clear signs that the era of peat was over for all but a handful of labourers.

KEY WORDS: Drenthe, gasification, peatland settlements, peat as a substrate

INTRODUCTION

Peat for fuel has been extracted in The Netherlands since time immemorial, and the systematic industrialised extraction of peat for commercial purposes dates back to the 13th century. However, the rise of the peat manufacturing industry can be placed within the last quarter of the 19th century. We define peat manufacturing as a process by which the raw material peat is transformed into another product, rather than being destined for use as fuel. The rise of the industry took place at a time when, in The Netherlands, peat was gradually being superseded by coal as the most important source of energy. Since most of the older bog areas in the country had already been completely exhausted by 1850, peat extraction was increasingly concentrated on peatlands in the south-east of the province of Drenthe and the adjoining province of Overijssel (Figure 1).

There is little recent English-language literature on peat manufacturing after 1875. Two exceptions are Donal Clarke's journey into the archives of *Bord na Móna*, Ireland (Clarke 2010) and a small book about the history of peat cutting in the British Isles (Rotherham 2009). Haverkamp (2013) covers 100 years of peat extraction by the internationally operating company Klasmann-Deilmann GmbH, but his book is available in the German language only. H.F. van de Griendt, one of the founding fathers of the International Peat Society (IPS), has published a study about his family business in Dutch with an English summary (van de Griendt 2002).

This article focuses on the history of peat processing by the Dutch manufacturing industry between *ca.* 1875 and 1992. It is based on the book *Van Turfstrooisel tot Actieve Kool*, which was originally published in Dutch (Gerding 1997). Most of the research for this book was carried out using

Dutch sources held in the archives of the Province of Drenthe (Drents Archief) in Assen.

THE DUTCH PEAT PROCESSING INDUSTRY

Although the peat processing industry distinguishes itself from the business of peat extraction for energy (called here *peat fuel*), this does not mean that the peat manufacturing industry did not itself produce fuel peat if the price was right. From the beginning in the 1880s until after the Second World War, both activities often went hand in hand.

Leaving aside peat fuel, we can distinguish four different branches within the peat manufacturing industry. In this industry, peat from the bogs serves as raw material to be processed into another product in an industrial way. This other product falls within one of three categories, viz. *peat moss litter*, *active carbon* and *garden peat*.

- In the production of peat moss litter, the top layer of the bog (white peat) is dug out and dried (after which it is known in Dutch as *bolster* peat) and subsequently transported to a factory where it is ground into litter.

- In the production of active carbon, the lower more decomposed black peat is excavated and dried, after which it is transformed by gasification in a factory into active carbon.

- Garden peat is produced by loosening a layer of black peat with a rotary cultivator after which it is left to freeze right through, and thereby crumble, *in situ*. The peat can then be sold directly as a finished product, or it may be mixed with other ingredients to produce several varieties of high-quality peat-based potting compost.

Alongside these three main applications there have been attempts to make other products from bog peat such as peat fibre, peat cardboard and ammonia. These proved to be either technically infeasible or not cost-effective. Also, in order to compete better with coal, a number of peat extracting firms attempted to industrially raise the calorific value *per* product unit of fuel peat by compressing peat into briquettes in factories. Lastly, when oil was in short supply during the Second World War, peat coke was produced in large quantities. This was used as motor fuel by converting it into gas in generators mounted on vehicles.

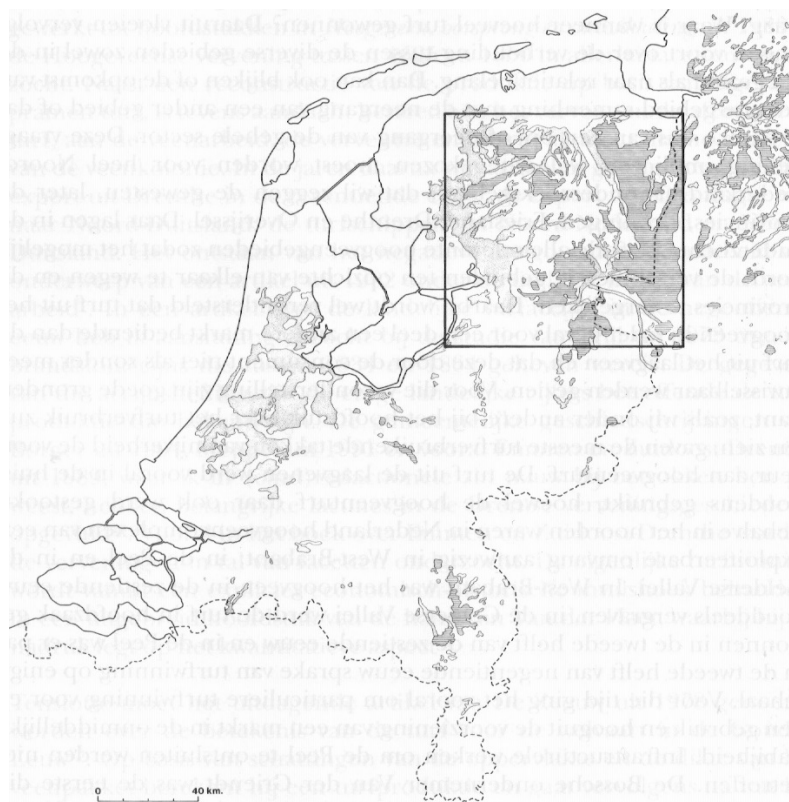


Figure 1. Map of The Netherlands showing the extent of peatlands in 1500 (all shaded areas) and 1992 (darker shading). The black square encloses the peat extraction areas in the northern provinces of Drenthe and Overijssel. Source: Gerding (1995).

The three main branches of the industry did not arise simultaneously. Peat moss litter production is the oldest branch, dating from around 1880; active carbon has been produced since 1921; and garden peat was developed during the 1960s. Extraction of peat for fuel has virtually always been manual work carried out by individuals. In contrast, the peat manufacturing industry has been mechanised, mainly since the Second World War. There is also a difference in the scale of activities. In peat fuel extraction, small-scale enterprise was predominant; whereas in peat manufacturing we see concerns with large holdings of bogland and, usually, a whole array of peat processing activities. In order to operate a peat moss litter factory cost-effectively, the contractor must have a guarantee of sufficient and uninterrupted supplies of 'bolster' peat. To this end it is necessary to have enough bogland surface at one's disposal. The same holds true for the production of garden peat.

A GEOGRAPHICAL OUTLINE

By the second half of the 19th century, south-eastern Drenthe was the last large exploitable peatland area in The Netherlands, but also the most remote from existing waterways and markets. It became feasible to exploit Drenthe's boglands only after other areas were exhausted and canals had been laid out and linked to existing networks. The opening-up of the Drenthe bogland area by canals took place from four directions. The German border was reached in 1893 and in 1898 a connection with the German canal system was achieved. Besides the four main waterways the peatlands were intersected by a multitude of main ditches, side ditches, local ditches, drains and so on, resulting in a fine, regular network of waterways to drain all of the individual bogland parcels and make them accessible to the barges that would carry away the peat (Figure 2). From around

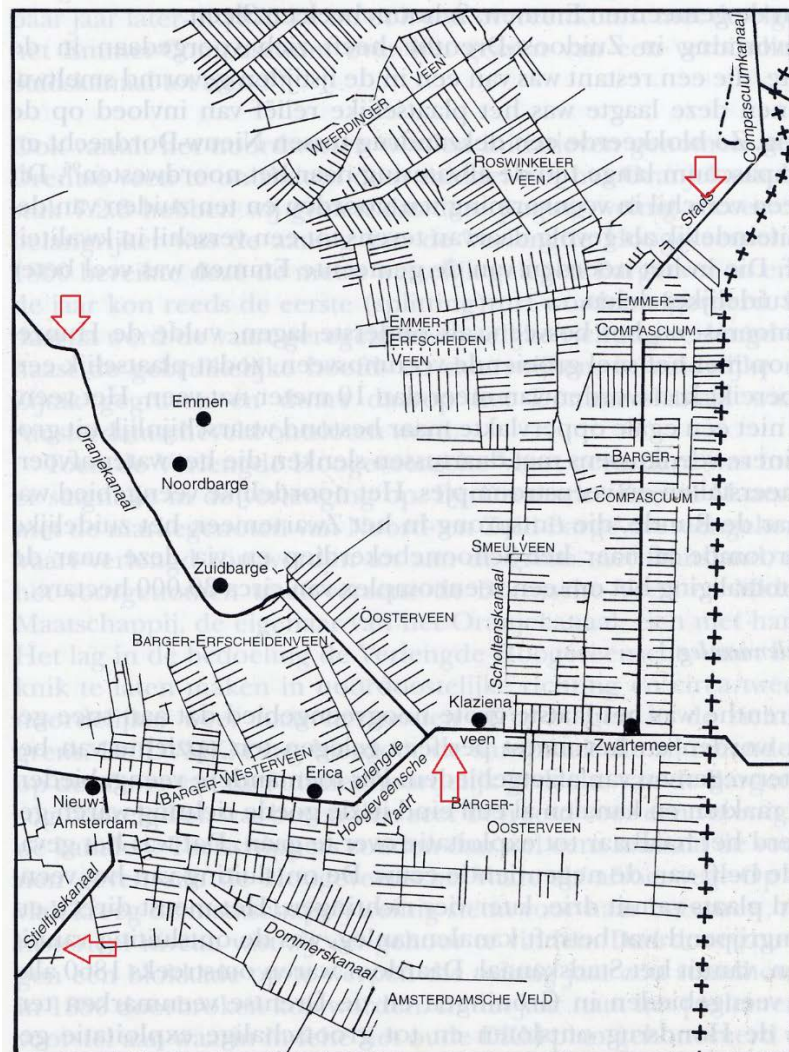


Figure 2. The peat extraction area in the south-east of the province of Drenthe, showing the main canals (red arrows). Source: Gerding (1995).

1860 about 15 peating villages sprang up, almost always along canals and ditches. At the outbreak of the First World War, peat extraction activity was at its peak and about 30,000 people inhabited the area.

PEAT MOSS LITTER INDUSTRY

The history of the Dutch peat manufacturing industry can be divided into three phases. The first phase started in 1881 when the first peat moss litter factory (e.g. Figure 3) was built in The Netherlands, and ended with the total collapse of peat moss litter sales in 1918. During the second phase (1918–1945), the industry went through a prolonged crisis. In the third phase, since *ca.* 1960, it shifted towards the production of garden peat and potting compost.

Peat moss litter is made from the upper layer of lighter peat (white peat), the *bolster*. Peat labourers cut and dried bolster peat in the same way as all other types of peat. Subsequently it was ground and sieved in the factory to produce peat moss litter in two different qualities, namely 'crude' and 'fine'. The two main uses of peat moss litter were as stable floor

covering (crude) and a soil improver for agriculture (fine). When the litter had been compressed into pallets and bound with latches and iron wire it was ready to be shipped and sold. The expanding railway network made it possible to transport the product across the whole of Europe. The English market, especially, was of major importance to the Dutch peat producers. Because of the prominence of horse-drawn tramways in the second half of the 19th century, there was great demand for peat moss litter in the big cities. It was often preferred to straw, because:

- the absorption capacity of peat moss litter was far greater than that of straw;
- the litter was bactericidal because of its acidic composition; and
- it could neutralise the odour of ammonia from animal urine.

These three factors, together with the requirement for less storage space than for straw, explain the preference of the tramway companies for peat moss litter. A gradual change to the use of peat moss litter in army horse stables also occurred.



Figure 3. The peat moss litter factory of the Veldkamp Company near Nieuw-Amsterdam, *ca.* 1930.

The number of peat moss litter producers in The Netherlands quickly increased after 1881 and the Griendtsveen Company developed into the most important peat moss producer in western Europe with major international connections. At the start of the 20th century it possessed peat concessions and peat moss litter factories in The Netherlands, England and Germany. In 1900 Griendtsveen started to co-operate with the British Moss Litter Company and jointly established a sales agency under the name of 'The Peat Moss Litter Company' that dominated the English market.

Sales of peat moss litter dropped after the first decade of the 20th century because of the replacement of horse-drawn trams by electric trams, motor cars and omnibuses. But still, production levels remained considerable and some peat moss litter entrepreneurs extended their land holdings across the German border into Lower Saxony. During the First World War the demand for peat moss litter increased enormously because of the massive use of horses in the warfare. At the end of that war, however, demand collapsed. The German army was dismantled and other armies replaced their horses with motorised transport. The peat moss litter industry was plunged into a deep crisis that lasted until the Second World War. Another reason for the crisis being so prolonged was the fall in demand for peat fuel after 1920, as it was quickly pushed off the market by cheaper coal. The peat moss contractors, who possessed great reserves of bog suitable for peat fuel extraction underneath the bolster peat topsoil, were hit very hard and many retired altogether. Also, competition from Germany on the home and foreign markets increased. As a result, half of the Dutch peat production capacity had disappeared from the market by 1930 (Figure 4).

After the Second World War a new phase in the history of the Dutch peat moss litter industry started, for various reasons.

- The first reason was that the government no longer wanted to support peat extraction. South-east Drenthe was to be industrialised and the peat labourers trained to become factory workers. Work in the boglands was discouraged. The peat industry was, as a consequence, compelled to mechanise.
- Secondly, the government developed a policy of trade liberalisation within the framework of European economic integration and peat moss litter lost its protected status. Therefore, the Dutch peat moss litter contractors intensified their co-operation with the Germans, and German competition could no longer be held in check after 1960.
- Thirdly, a method to make black bog peat suitable for what is now known as garden peat was discovered around 1960. The great reserves of black bog peat under the surface bolster peat that were still held by the peat moss contractors could no longer be sold as fuel. Black peat had the disadvantage that, once dry, it no longer absorbed moisture. It was discovered that this irreversible drying could be forestalled by letting the bog freeze right through. The product thus formed, known as garden peat, was very suitable for soil improvement and, after mixing with fertiliser, as a substrate for potting soil.

Thus, a definite change occurred around 1960. The production of garden peat and potting soil increased rapidly while peat moss litter production all but ended in the two following decades.

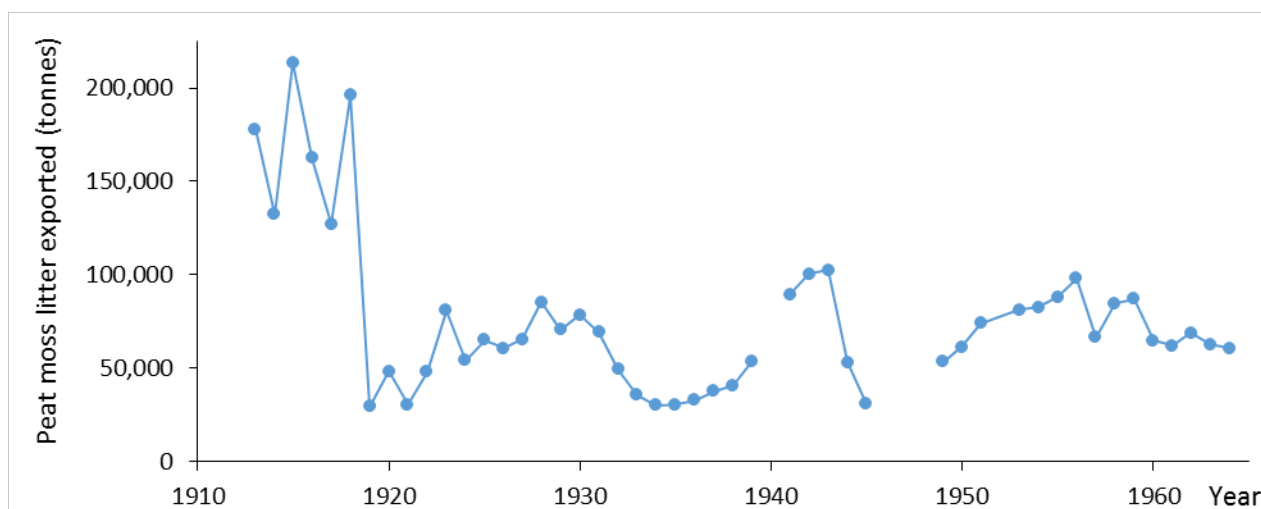


Figure 4. Annual exports of peat moss litter from The Netherlands, 1913–1964. After Gerding (1997).

THE PURIT

The NV Purit Maatschappij, originally known as Klazit, was established in 1921 by Maatschappij Klazienaveen. This company was a subsidiary of the multinational W.A. Scholten concern, which specialised in the production of beet sugar and potato flour. Maatschappij Klazienaveen (named after Scholten's wife Klaziena) had exploited thousands of hectares of peatlands in south-east Drenthe since the 1890s, for fuel and peat moss litter.

Active carbon was originally used mainly in the clearing of sugar. The Norit Sugar Company experimented with the carbonisation of peat during the First World War because of the scarcity of wood. Peat proved to be singularly suitable. In 1919 Norit tried its process in a W.A. Scholten sugar factory. One of the laboratory workers succeeded in persuading Maatschappij Klazienaveen itself to produce active carbon. This resulted in the erection of the Purit factory in the village of Klazienaveen (Figure 5). It soon became apparent that the laboratory worker had copied the Norit process, thereby violating patent laws. A long-term conflict between the boards of Norit and Maatschappij Klazienaveen followed. After tough negotiations,

Maatschappij Klazienaveen decided to cut its losses and sell the Purit factory to Norit.

The significance of Purit for the south-eastern Drenthe peatlands is threefold.

- In the first place the factory offered employment. It started with 21 employees, and in its heyday (see Figure 6) there were over 300. During the 1950s, when Purit was extracting its own peat, 100 (off season) to 400 (high season) people were employed in peat harvesting.
- Secondly, Purit has been a solid buyer of peat from other peat enterprises up to the present day. In 1947 a conflict arose between Purit and the peat contractors. Purit wanted to pay less than the contractors demanded, and found itself backed by the government. The Purit Company, which was responsible for a significant flow of valuable dollars into the Dutch treasury because of its exporting activities, came out the winner. This conflict led to Purit starting to undertake its own peat extraction. During the 1950s and 1960s a major part of Purit's raw material was dug from its own concessions, as the boglands of other Dutch peat contractors were slowly becoming exhausted or were being used for garden peat production.



Figure 5. The Purit plant in Klazienaveen, 2000.

- Thirdly, the exploitation of the boglands by Purit strongly stimulated the mechanisation of peat extraction in The Netherlands. After the Second World War Purit came into possession of the exploitation rights for large areas which had not yet been divided into small plots for extraction by traditional methods. Therefore, the use of large peat excavators like those known from Germany was possible. Purit was supported in applying this machinery by the government allocating funds from the Marshall Plan.

During and after the 1970s, Purit increasingly shifted its intake to German suppliers, the foremost of which was Klasmann-Deilmann. After 1996 the factory changed ownership a couple of times, and since 2012 the Purit has been part of the Cabot Corporation.

SUNDRY PEAT-HANDLING INDUSTRIES

Experiments in making other factory products out of peat were also undertaken in the late 1890s. Two examples are the production of peat fabrics for clothing and peat cardboard.

In 1884 the Frenchman J.L. Allagnou established a small factory for the production of fibres from peat. The fibre material (root remains) could be used for making felt. Allagnou's factory produced for only a short period before lack of customers and the low quality of the product caused it to shut down. The felt hats tended to lose their shape once it started raining. Another Frenchman, Beraud, took over the machinery and tried elsewhere in the country, but also met with little success.

Manufacturing cardboard from straw was already an established industry in south-eastern Drenthe when the Scholten firm tried to produce cardboard from peat. Knowledge of the manufacturing process was obtained from the German chemist Ubbelohde, who had patented it. Scholten built a new peat cardboard factory alongside his peat moss litter factory at Klazienaveen. He had machinery brought over from his cardboard works at Sappemeer in Groningen Province, where paper and cardboard were made in the traditional way from straw. He attempted to sell the product on the colonial markets of the Dutch Indies, but was not successful. The peat fibres were too crumbly to produce good-quality cardboard. The factory was duly closed down in 1901.

During the second phase of development of the peat-handling industry, which took place mainly during the first two decades of the 20th century, the gasification of peat was a central theme. This chemical process can yield several by-products, e.g. ammonia, tar and alcohol. Chemists developed peat gasification factories which produced peat cokes as the main product as well as the by-products mentioned above. The cokes (or active carbon) could be used in the blast furnace industry, in refineries and as an energy source for gas generators. An ammonia factory was founded in 1918. Because the supply of ammonia from German factories had come to a halt during the First World War it appeared initially to be cost-efficient to produce ammonia from peat in The Netherlands. However, as industry recovered after the war, the Dutch factory proved unable to compete with German producers and the experiments with peat gasification were soon abandoned.

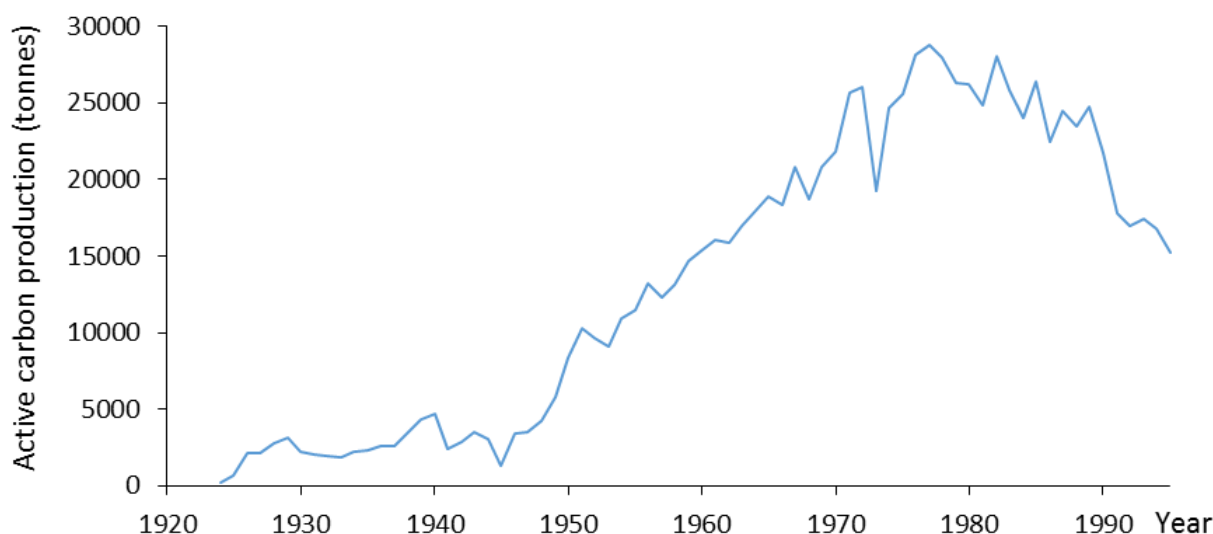


Figure 6. Annual production of active carbon by the Purit factory, 1924–1995. After Gerding (1997).

During the third phase of experiments there was a return to simpler processes. In this phase (1925–1945) the rationalisation of peat extraction was attempted. The result was that the *NV Nederlandsche Brikettenfabriek*, the *Rijksturfproefstation* and the *Veenderij Proefbedrijf* (trial and research) came into existence. As the crisis in the peat industry took hold, the peat extractors tried to find other ways to profit from their possessions. They asked the government for support, and one of the supporting measures was the establishment in 1925 of a government testing station, the *Rijksturfproefstation*. The station tested a series of inventions which yielded marginal results for the peat-handling industry. After 1930, research to rationalise the process of peat extraction was conducted using a method (known as Taylorism) that had long been used in factories, in which a management consultancy timed the activities of peat labourers. Although some marginal improvements were shown to be possible, the overall result was that no improvement in cost efficiency could be achieved by a peat extractor using the existing system, in which female and child labour still played an important part. The research was discontinued.

Another peat extraction method was the digging of gravel peat, which can be made into peat briquettes. Gravel peat was dug by cutting the topsoil with a rotary cultivator. The loosened peat soon dried, then it could be collected and compressed into briquettes. A German factory installation was bought for this purpose in 1940, but neither gravel peat digging (the Dutch climate being too wet) nor compressing into briquettes (the machinery being worn and outdated) was successful. The experiment was duly terminated after the Second World War. During that war, peat extractors produced coke on a large scale using the closed dome process. The coke was used in gas generators for motor cars, as an alternative to petrol.

After the war, the rationalisation of peat extraction was continued through mechanisation, in which Purit played an important part. The shift towards garden peat production proved to be a Columbus' egg for the peat extractors. The rising demand for potting soil in market gardening and horticulture, combined with increasing sales on the retail market, created a new future for this branch of peat industry.

PEAT CONTRACTORS AND LABOURERS

Following labour strikes in the peat areas in 1888 and 1889, a government committee was set up to make an inventory of problems. The main issues identified were bad housing, alcohol abuse, low wages and long

working hours, together with abject practices such as a mandatory truck system. The state committee was the starting point for stricter regulation of work in the boglands. The peat manufacturing industry was amongst the first to implement changes, but peat labouring remained an all-family concern until after the Second World War because the peat labourer could earn a (very modest) living only by setting his wife and children to work as well.

The building of peat moss litter factories broke the previously seasonal pattern of work in the peat areas, because the bolster was dug in autumn or early spring; *viz.* after the peat fuel extraction campaign - which lasted from April to July - and the drying process, which took at least two months.

The introduction of bolster digging significantly increased employment. The peat moss litter industry provided almost year-round work in the boglands for a large proportion of the population of south-eastern Drenthe. The peat moss employers built solid stone houses for their regular employees and the labourers could participate, on a voluntary basis, in health and pension funds, thus safeguarding their social security. The presence of the large companies was also of great importance for the social, religious and cultural development of the region. They ordered churches and schools to be built, subsidised clubs of several types, and thereby steered a transformation of the previously chaotic peating world into a more or less regulated village society.

Even before the start of the 20th century, coal had started to supersede peat as a fuel. However, the outbreak of the First World War brought about a revival of fuel peat production to a level that was previously unknown, because it interrupted the supplies of coal. Peat production boomed, prices soared and wages increased substantially. The 'peat rush' caused an influx of labourers from elsewhere who wanted to profit from the boom. However, when the peat market collapsed almost overnight as imports of coal were renewed after the war, the area was plunged into a deep depression from which it never really recovered. The peat manufacturing industry suffered as well. The years 1920–1940 were characterised by great poverty and distress. The population surplus in the area was estimated to be 50 %, and a dole system had to be created to alleviate the most pressing needs. By the end of the 1930s it had become abundantly clear that peat fuel extraction was a dying business and a shift to completely different branches of industry would be needed if south-eastern Drenthe wanted to offer employment to its inhabitants. Thus, after 1950 the municipality of Emmen became one of the nuclei of the government's post-war industrial policy. Because the

new factories needed many labourers, young men in the boglands were discouraged from seeking employment in the peat industry. Some 1,500 labourers were still working in the peat industry in the 1960s but, also because the bogland ran out, they were a dying breed. Apart from the Purit, only the producers of peat moss litter and garden peat continued to exploit the bogland, with a steadily decreasing number of employees because of mechanisation. After 1992 they were compelled to buy in their peat supplies from elsewhere.

CONCLUSION

The extraction of peat in The Netherlands virtually ceased after 1992, ending more than twenty centuries of exploitation of Dutch peatlands by man for energy and industrial purposes. Elsewhere in the world the extraction of peat for horticultural uses as well as for energy continues to this day; and the importance of the horticultural sector in The Netherlands means that the country is still a major player in the field of peat-based composts and growing media. Now that peat extraction in The Netherlands has ceased, the peat manufacturing concerns are compelled to buy their raw material abroad, and much (garden) peat is currently imported from the Baltic countries. Peat is still being extracted in Lower Saxony, just across the Dutch–German border, but there is growing criticism of this activity from conservationists and politicians. Peat extraction is killing nature, so they claim. The Dutch peatlands had already almost disappeared before nature conservation was invented. Of the more than 25,000 ha of peatland originally present in south-east Drenthe only 2,500 ha remains as a designated nature reserve, the Bargerveen.

Only a few traces of the large-scale activities of the peat industry have survived: a few factory buildings, some locks in derelict canals, the remains of a ditch or waterway, a few scattered cottages of former peat labourers now turned into rural idylls. But it is the structure of the landscape - the linearity and the wide scenery - that is most reminiscent of the closed book of peat extraction in The Netherlands.

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- Drents Archief in Assen (the public records office for government archives within the province of Drenthe) contains records of some private peat companies, of which the following are relevant to this article:
 0794 Maatschappij Klazienaveen
 0240 Griendtsveen Turfstrooisel Maatschappij B.V. en voorgangers
 0203 C.V. onder de firma J.C. Rahder
 0271 Vereniging Nederlandse Verveners Turfstrooiselfabrikanten
 0197 N.V. Nederlandsche Turfbrikettenfabriek

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