

Amsterdam Centraal Station: restoration history can be clearly seen in the façade.

BUILDING STONES OF OLD AMSTERDAM

By Scott Engering *geologist and building stone consultant – contributing European editor*

Holland is renowned for its fine brick buildings but it is in the use of ornamental stone, imported during a great period of trading in the Golden Age of the 17th century, that Dutch architecture comes to the fore, especially in the famous gables.

Nowhere is that more apparent than in Amsterdam and the best way to appreciate this historic city, is on foot.

This walk is based on an extensive account of the building stones of Amsterdam by Wim Dubelaar of the Dutch Geological Survey, in his now out-of-print book *Steenrijk Amsterdam*. The walk is designed for anyone who has a few hours to spare and who wants to wander around a World Heritage Site at leisure and see buildings and sculpture that make stone such an interesting material and Amsterdam such a wonderful place.

Starting at **Amsterdam Centraal Station**, obtain a map from the VVV (Tourist Office) on Stationsplein and walk up Damrak, making sure that you don't get taken in by the obvious tourist traps along the way. You can't fail to notice the **Berlage's Exchange** (1903), most notable for its monumental qualities and use of nine million bricks.

Stone does not greatly feature here, but the sculpted lintels and quoins introduce Obernkirchener sandstone, one of a few good-quality materials that were imported in great quantities from West Germany – a source of stone that Holland still heavily relies upon for restoration work today.

At Beursplein, we encounter the old **Stock Exchange** (1916), now Euronext. Have a good look at the alternating bands of green/brown volcanic tuff from the Eifel region of Germany, and the contrasting pale cream French limestone. Here, the intricately carved elephant heads still retain their sharp lines – a good indication of the durability of the best French Jurassic limestones. At the rear of the building, there are some interesting frieze sculptures on Warmoesstraat.

The next monumental building of note is **De Bijenkorf** (1912), one of Holland's best-known department stores. The elaborate, yet still crisp,



Berlage's Exchange: constructed with nine million bricks.

Stock Exchange: the carved elephants illustrate the durability of French Jurassic limestones.



decoration of this finely cross-bedded sandstone building catches the eye. It is also German sandstone, but of Triassic age.

Cross to Dam Square and take a good look at the **Royal Palace** (1655), built as the New Town Hall by Jacob van Campen and using yet another German sandstone, Bentheim. Obernkirchener stone has been used for low-level repairs.

All three German sandstones visible from this point possess broadly similar characteristics: grey/light brown with varying degrees of natural iron content. With the cleaning of stone being currently out of favour in the Netherlands, the problems of matching colour aren't as acute as in the UK, but the stone restorer must pay attention to the grain size and inherent porosity of the stone. A poor specification in a climate that is frequently exposed to wind, rain and frost can lead to accelerated decay, especially on saturated weathering courses.

Before leaving the Royal Palace, take a good look at the frieze sculpture to the pediment and consider the problems of conserving such fine architectural work. The Italian Carrara marble from which it is carved is unsuited for external use in a cold, damp, northern European climate and will be subject to rapid decay, especially where acidic pollutants form such a blackened, gypsum-bearing crust.

At **Nieuwe Kerk** (1400-) we see another yellowish-coloured limestone, high up in the south elevation. This is a soft Tertiary limestone from Belgium. It was quarried from thin natural beds, with individual blocks of stone not much larger than a brick, and is suitable only for basic walling. Along with the similar Gobertange stone, it was frequently used in the Middle Ages but quickly superseded around 1500, when large blocks of the durable Bentheim sandstone, used here for dressings, became available in large quantities.

The south entrance porch and adjoining masonry provide a good opportunity to compare and contrast Bentheim sandstone and another example of Eifel volcanic tuff. From a distance, both possess a similar colour – grey/brown with yellowish variations – but, at close range, the tuff can be seen to be open-textured and poorly cemented; a factor that leaves this material highly susceptible to weathering.

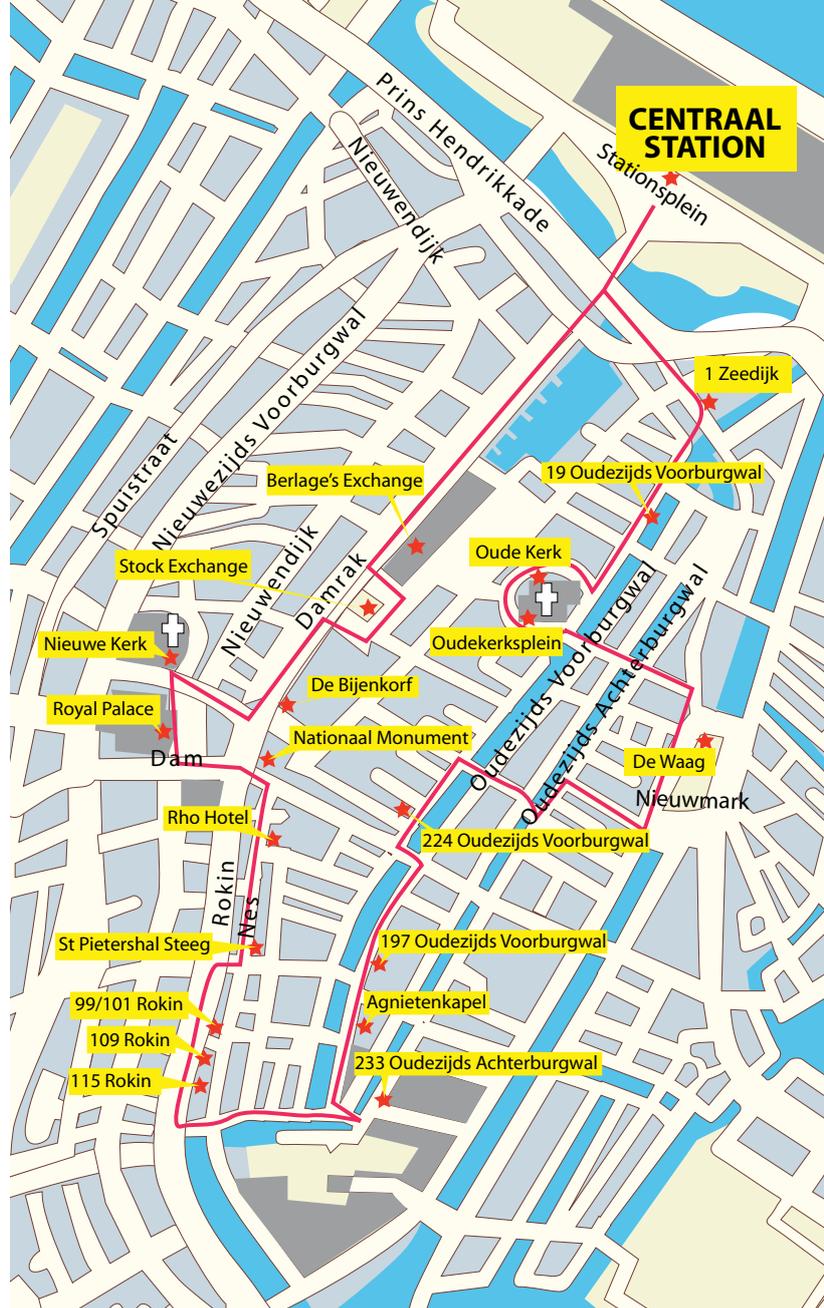
Cross Dam Square to the **Peek and Cloppenburg** (1916) building for yet another example of German stone, this time the Triassic Muschelkalk limestone. Although probably best suited for use as ashlar blocks, the frieze sculpture is an excellent example of the Arts and Crafts style.

At the **Nationaal Monument** (1956), we see an example of the world-famous Italian travertine from the Siena region in Italy. A similar material was used to build the Colosseum and much of ancient Rome. The Nationaal Monument has had conservation problems. A close look reveals damage associated with differential expansion between the cladding panels and the concrete and brick core. The monument has been dismantled and reconstructed to rectify these structural defects, and to combat indiscriminate attacks from vandals with aerosol sprays. It is now cleaned and washed on a regular basis.

The next step is to wander down Nes, where the **Rho Hotel** (1908) provides an excellent example of dark-grey Belgian Carboniferous limestone.

Widely used throughout the Netherlands for its hard-wearing qualities, and mainly seen in paving and steps, its versatility is illustrated here in a wide variety of intricately tooled finishes. The richly-decorated stonework reflects the prosperity of its former owner, H Drijfhout & Zn, an Amsterdam gold trading company.

Continuing up Nes, take a good look at all the stone used for building, especially the window sills and various architectural details. At Saint Pietershal Steeg, stop and take a good look around. Here, the rear of the RABO bank is clad in distinctive red Balmoral granite from Finland and the fountain is made from granite from Portugal, best known for

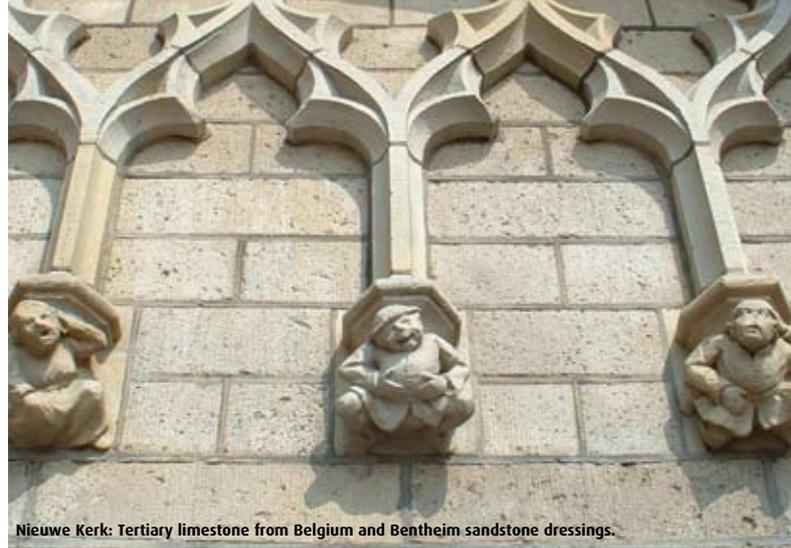


De Bijenkorf: finely cross-bedded Triassic age German sandstone.

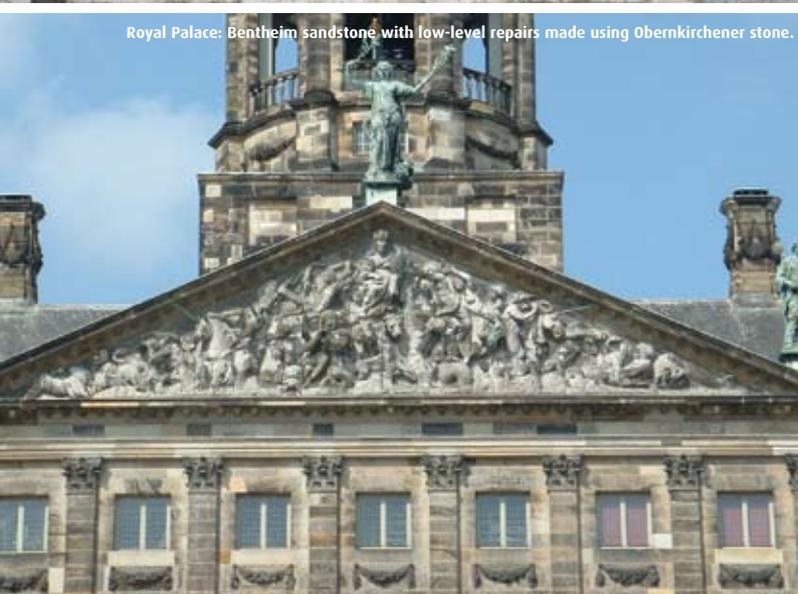




Nationaal Monument: world-famous Italian travertine from the Siena region in Italy.



Nieuwe Kerk: Tertiary limestone from Belgium and Bentheim sandstone dressings.



Royal Palace: Bentheim sandstone with low-level repairs made using Obernkirchener stone.



Rho Hotel: dark-grey Belgian Carboniferous limestone.

its use as hard landscaping, as seen in Dam Square. Also look at the old carved keystones and a plaque from 1644, which show how the old sandstone has weathered over the years.

Turning down Wijde Lombardstraat, continue up Rokin and stop briefly to look at 99 and 101. Here a variety of granites have been used in a building that is obviously modern, but its design takes into account the principal architectural elements of the traditional 17th century style.

109 Rokin demonstrates the practice of painting limestone, which is nowadays considered undesirable due to its impermeable nature and problems associated with the deterioration of the stone. However, in Amsterdam, most of the ornamental Dutch gables were painted soon after they were built.

THE JOURNEY CONTINUES

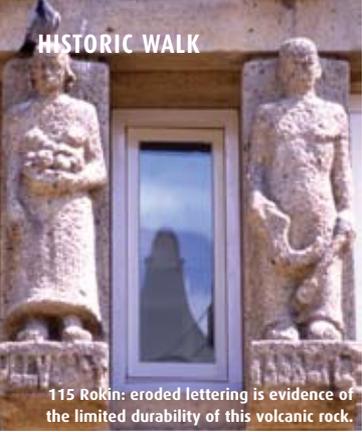
The first leg of this walk around the Binnenstad of Amsterdam ends at **115 Rokin**, where the same geologically recent, compacted volcanic ash from the Eifel region in Germany that appeared in both the Stock Exchange and Nieuwe Kerk, is displayed. A coarse variety has been used for the sculpture and finer-grained stones for the weathering courses. The eroded lettering at the base of the statues is now barely legible, providing evidence of the limited durability of this volcanic rock.

Turning down Langebrugstraat into Grimburgwal, the next point of call is **233 Oudezijds Achterburgwal**, on the edge of the famous Red Light District.

Here, the elaborately decorated gateway of the former Apotheek met Wachtkamers (1875) provides an excellent example of figurative



Peek and Cloppenburg: an excellent example of the Arts and Crafts style.



115 Rokin: eroded lettering is evidence of the limited durability of this volcanic rock.



233 Oudezijds Achterburgwal: the weathered, delaminated faces have a distinctive 'encrinitic' texture.



Agnietenkapel: one of the finest examples of ornamental stonework in the Binnenstad.



Grand Hotel: modernist sculptures carved in pale-brown German granite.



De Waag: Belgian Gobertange limestone creates a striking effect.



Oudezijds Voorburgwal: distinctive stoeps built using Belgian Carboniferous limestone.

sculpture carved in Bentheim sandstone. Take a good look at the pale limestone blocks that form the pilasters. This Jurassic limestone is from Euville in France. Although, at a distance, the colour and texture appears very similar to other Jurassic oolitic and shelly limestones, a close inspection of the weathered, delaminated faces will reveal a distinctive 'encrinitic' texture comprising sparkling, crystalline fragments of fossil crinoids or 'sea lilies'.

Compare this stone with the dark grey Belgian Carboniferous limestone that is used for the decorative jambs and the plinth.

At this point, the arguments for and against cleaning of stone monuments could be considered. While research in Scotland, for example, shows that the use of chemicals and abrasives can cause extreme damage, as well as generating a health hazard from airborne silica, careful washing with gentle water sprays can prevent the build up of atmospheric pollutants, as well as highlighting the attractive qualities of the building.

Moving on to the Huis op de Drie Grachten (1610), stop briefly to examine the relative physical characteristics of the Bentheim and Obernkirchener sandstones, where they have been used for the steps and jambs respectively.

Continue along Oudezijds Voorburgwal to the gateway of the **Agnietenkapel** (1571), where there is one of the finest examples of ornamental stonework in the Binnenstad. Here, the ubiquitous Bentheim sandstone is seen to be weathered black, typical of all kinds of sandstone, and contrasts with the very pale Belgian Carboniferous limestone, with its distinctive laminations, used for the boldly carved pilaster blocks.

The sequence of rocks, known traditionally as the Carboniferous Limestone, is subdivided into older Tournaisian and younger Viséan strata. It is the Tournaisian limestones from Belgium that are most commonly seen in buildings, with their colour ranging from a dull blue-grey to black, depending on the type of tooled finish and degree of polishing that is applied to the stone. However, unlike Tournaisian limestones, Viséan limestones develop a pale silver-grey patina and are specifically selected, and particularly valued in Belgium, for this characteristic.

Carry on until you reach St Agnieten Straat, where there is a sudden change in architectural style to the renowned early 20th century 'Amsterdam School' at 197.

The austere brick extension to the former Town Hall (1924) conceals one of the city's architectural treasures, the old Admiralty, built in Classical Baroque style. Now part of the luxurious **Grand Hotel**, the façade is especially notable for the fine sculptures by Hildo Krop carved in pale brown German granite. Many of his other distinctive modernist sculptures, using similar material, decorate many of the large bridges and other fine monuments in central Amsterdam.

At this point, take some time to examine the typically Dutch townhouses of **Oudezijds Voorburgwal**, where the ground floors and the distinctive steps are predominantly built using Belgian Carboniferous limestone. Unfortunately, despite its World Heritage status, there is neglect of some of the buildings and graffiti problems persist. A typical use of this limestone can be seen at 224, where a variety of tooled finishes, including lettering, are displayed.

At other locations, on weathered surfaces, you may see crenulated laminations parallel to the natural bedding planes, called stylolites, which have opened up and are now considered to be a potential defect and to be avoided in stone for restoration work. While Belgium has been the historic source of these limestones, Rijksdienst voor De Monumentenzorg, the state conservation agency, have investigated



Oude Kerk: built with Belgian Gobertange and Lede limestones and Bentheim sandstone.



Oudekerksplein: distinctive 'granitic' paving.

19 Oudezijds Voorburgwal: the 'animated neck gable' is the oldest of its kind.



Zeedijk: one of only two wooden houses remaining in Amsterdam.



geologically similar material and much stone is now sourced from the Republic of Ireland for urban landscaping and restoration work.

Crossing back over the canal and cutting through to the southern end of Nieuwmarkt, you will be presented with the best view of the magnificent **De Waag** (1488), formerly an ancient entrance to the city and once known as St Anthony's Gate. It is the brickwork and the magnificent roof that first catches your eye but here the Belgian Gobertange limestone has been used for a striking decorative effect.

At close quarters, examine the stone string courses and quoins, and note how the limestone has weathered poorly in comparison with the brickwork and the Bentheim sandstone that has been used for the corbelled base of the octagonal section of the turrets. Many of the original limestone quoins have since been replaced with the more durable sandstone. At lower level, fine relief carvings to the lintels above the doorways depict the tools and symbols of the respective trade guilds housed in each turret.

From De Waag, walk down Molen Steeg and Oude Kennis Steeg and stop to take in the view of **Oude Kerk** (1300-). In common with most large ancient churches, Oude Kerk has been extended, partially rebuilt and extensively restored over the years, with a wide variety of materials. When unravelling the construction history of such buildings, archaeological investigation usually relies on existing documentation but a study of the building stone and structural details can often provide vital clues.

Here, the distinctive soft, thinly-bedded, cream-coloured Belgian Gobertange and Lede limestones were used between 1350-1400, with a sharp transition to the use of German Bentheim sandstone after 1450. Above the south entrance to Oude Kerk, we also see an elaborate Muschelkalk limestone relief carving on one of the later additions to the church.

Walking clockwise around the building, there is an opportunity to observe the various characteristics of each type of stone at close range.

Don't forget that the distinctive 'granitic' paving at **Oudekerksplein**, with its wide variety of colours and textures, also contributes significantly to the ancient urban landscape. All too often, repairs to historic pavements are undertaken with scant regard to the original provenance of the materials. Even a well-qualified geologist will struggle to find a suitable match for these old igneous rocks, whose original quarry sources include Belgium, Scandinavia, the Channel Islands and Scotland.

We have had the opportunity to appreciate some of the very best monumental historic buildings in Amsterdam, but the real character of the Binnenstad is reflected in the town houses; the architecture of the citizens. Although essentially constructed of brick, their prosperity is expressed in the elaborately carved cornices and gables, and here we see some of the very best work of the artisans from the Golden Age.

While most of the work is just designed to add a decorative flourish to the stone weathering courses, many of the gables, frequently decorated with scenes from ancient mythology depicted on a grand scale, could be considered as sculptural masterpieces in their own right.

Having fully explored the Oude Kerk, take your bearings from the Dread Rock Café, and without crossing over, turn left and stop at the Feelsgood Café where, from a window seat, you can appreciate the view of **19 Oudezijds Voorburgwal** (1656) across the canal. The 'animated neck gable' is the oldest of its kind, with its decorative scrolls in the form of two large dolphins. It is also unusual in that it has not been painted, thus revealing the true weathering qualities of the Bentheim sandstone.

At the end of this walk, before you return to Amsterdam Centraal Station, where the stone restoration history can be quite clearly seen in its façade, why not stop to enjoy the hospitality and a refreshing drink at **1 Zeedijk** (1550), one of only two wooden houses remaining in Amsterdam. Here, the proprietor of t'Aepje will no doubt be willing to tell you about its history, over a glass of his finest beer. Proost! ☺