Defects of the Victorian period 1837 to 1901

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The Victorian period is a well established period in the public mindset and many Victorian properties are still held up as the epitome of sturdy design and as symbols of the Empire. "Victorian" as a label is readily given to sturdy designs and engineering innovations but when assessing a buildings history there is a need to remember that trends and designs did not just start and finish just because Victoria was on the throne. One has to allow some leeway in the chronology of events with particular emphasis on demographics.

At the start of the period (1830s) the development of domestic properties were mainly achieved by self promoted speculative developers and Master craftsmen and through the next 70 odd years they would all grapple with the new technologies and readily available, mass produced, building materials of cast and wrought iron, brick, slate, glass and concrete. These were made all the more available because of the rapidly developing road, rail and canal networks.

The speculative builders in large towns were building for the newly emerging middle classes with influences from the gothic and classical periods copied and handed out en masse through pattern books and pre manufactured components. Unfortunately the rest of the populace was generally living in relative squalor for this was also the era of the "back to back" the cottage industry "topshop", the 2-up 2-down jerry built terrace and the ruthless land lord.

The era saw the increased prominence of engineers who brought a more methodical approach to material science. A key feature of the period was that materials were becoming more predictable.

- **What to look out for**

Domestic styles
Styles often quoted for the period include: Victorian vernacular, Classical, Queen Anne, Picturesque, Italianate, Arts and crafts, Victorian Gothic (many quote gothic revival but there is often fierce debate about this)

Mass
Most Victorian buildings have an over engineered look. Square and solid. Layout. The terrace was the mass housing solution built around major industrial towns. The "front room" and "back room" off a hall were nods to the gentry having rooms for "occasions". The presence of modern Bathrooms on ground floors usually indicates a conversion of the privy and coal house to the rear.

Decoration
Lots of it! Particularly on gables, in brickwork and terracotta panels. The Victorians liked the picturesque and were not averse to "tinkering" with older buildings. A good check is that the decoration was mass produced and tends to be repetitive. Masses of Swirls, swags and fruit gave way to dentilations, castellation, and fretwork.

Windows
Sash windows were the style of the day and because glass was better mass produced using the cylinder method the pane sizes were bigger. The common pattern was two panes over two. The weight of the glass meant that horns had to be introduced to the meeting rails to maintain the joint. Top tip. If you see six over six sashes with horns on the meeting rails this is a big clue that it could be a Victorian copy of a Regency window.

Common features

Prominent front doors (with stained glass inserts), slate roofs, recessed sash windows (2 over 2), front elevation gables, cant bay windows, ecclesiastical decoration influence. Brick patterns, Gothic emblems.

Traditional colours: ruby reds and deep forest greens (Brunswick green) - Prussian blue and purple came in midway through the century. Railings were more popularly green than black and in cities it became popular to paint windows brown.

Technology

Gas street lighting in London started in 1812 and most homes and streets were lit by gas lamps by 1859. The domestic filament light bulb did not appear until 1870 and started to supersede Gas for lighting around 1915-30. Central heating systems and forced ventilation systems appeared in public building such as hospitals.

Materials

Brick - Exposed, patterned, solid or cavity, mainly Flemish / English bonds.

In the 1850s mass production techniques were well developed and in 1870 the now familiar smooth and regular "Fletton" was widely available.

Lime mortars were traditionally used, however the introduction of cement mortars in 1824 means that not all properties can be assumed to have lime mortar. It is a common mistake when pointing to get the mortar mix wrong which can cause the brick faces to spall.

Cavity walls were becoming popular to the end of the period with wrought iron wall ties being used. Poor tying in of flank walls and the failure of wall ties is a known defect as is the use of timber coursing beams which, over time, rot.

Walls should be carefully checked for plumb or signs of bowing. Be careful assuming a wall is solid if you see headers as these could have been snapped in half prior to laying. Victorian Mass production should not be assumed to imply unified quality. Rogue bricks in a wall can be the cause of water penetration. Look for damp spots in isolation half way up walls.

Damp-proof courses

Damp proof courses were starting to become compulsory around the 1870s in England through local housing orders but builders were known to be introducing them in some form or other so no fixed date can be usefully given for DPCs.

The surveyor must be mindful that an assumption that "Victorian equals damp" is not a useful guide. There are many reasons a wall can show signs of being damp and in all cases thorough investigation must be undertake before assessment is given. The general assumption that a chemical damp course specialist is required because meter reading are high is also not a useful mindset.

All surveyors must be aware of how to correctly interpret modern damp meter readings.

Surveyors should also acquaint themselves with local knowledge of the types of aggregates used in mortars as some have a highly corrosive effect on iron wall ties.

Industrial buildings

Many Victorian industrial buildings have been converted into dwellings and the surveyor needs to be aware of some of the background to the building technology of the day when assessing properties.

Industry needed vast spaces for machinery and this called for new types of buildings. These vast structures needed larger floor spans and to achieve this engineers turned their sights on iron. Cast and wrought iron did a great double act. Wrought was good in tension but was a bit expensive and cast was cheap and good in compression so the combination of cast iron columns and wrought iron beams seemed the best solution.*

A key date is 1834 when at Orrells mill in Stockport the combined research of William Fairbairn and Eaton Hodgkinson came to fruition. The science of the I beam (particularly the neutral axis) had been discovered and this knowledge had produced in the most economic and mathematically determinable beam. Mild steel came along later in the century and was more ductile and malleable that iron. Its Achilles heel was corrosion. Little was known of protection and many structures suffered (and still suffer) from poor protective painting or detailing around encased steel.

Concrete was also used to build "fireproof" floors. This was mass concrete (not reinforced as we know it today) bonding together Cast or wrought iron beams. Concrete was not the highly engineered material we know today. Its performance was not commonly understood and mixes on site were not well monitored. Most builders were using "Parkes Roman cement" named after James Parker (1796 patented) and French engineers had also developed artificial hydraulic lime cement that cured under water (around 1810). In 1824 Ordinary Portland Cement was patented (Joseph Aspdin) and it eventually took over the market. The first "fire proof" industrial buildings probably started around 1810. These used the brick arch and iron beam system devised by Strut and Bage which was a "Jack arch" type system this lasted, in one form or other, until 1860. In 1844 Henry Hawkes Fox and James Barrett developed the first system to use an inverted T section cast iron beam set in mass concrete. This was called the "Fox and Barrett" floor and was thinner than the jack arch and gave a flat soffit. In 1852 they switched to a wrought iron I section girder system which lasted up until about 1870.The filler joist system and early beam and block systems arrived to the latter end of the 1890s. Surveyors need to be aware that these floors look substantial but are not easily determinable and are susceptible to corrosion of the beams and fire damage. Buildings that have at one time been derelict may be at risk if floors were exposed to rain or fire.

• Some of the common defects associated with the Victorian period

- Removal of Lateral support from one terraced house to another. The 'book end' effect.
- Rotten and paint sealed windows.
- Poor thermal performance in roof voids.
- Poor installation of modern conveniences causing moisture build up (addition of renders to solid walls, double glazing, bathrooms, roof insulation).
- Rot and creep in timber beams (check for blocked air vents).
- Differing loads caused by a change of roofing material (usually introduction of cement tiles from slate).
- Unsuitable mortar mixes used for repointing.

- Water ingress through solid masonry walls (not necessarily rising damp or a wall problem).
- Unbonded party walls to external wall junctions.
- Disused service pipes mistakenly tapped into.
- Deterioration of clinker in filler joist mass concrete systems.
- Collapse of mass concrete floors after fires and flooding.
- Corrosion of metal components in encased mass concrete.
- Poorly detailed openings in cheaper bonds of masonry or riser openings in mass concrete floors.
- Failing brick arches
- Corrosion in cast iron columns caused by incorporating rainwater downpipes or heating systems within.

Key points and useful observations

- Watch out for roofing materials that don't relate to the original build. (particularly concrete tiles)
- Check the floor plan layout and thickness of walls in association with the positioning of chimneys in domestic properties. There may be an older building inside.
- Don't assume brick walls are solid brick.
- Don't rely solely on modern structural calculation models when assessing the performance of fire proof floors or iron trusses. Use non-destructive testing techniques.
- Knocking out internal walls parallel to the front elevation on terraced housing may have dramatic effects on the lateral stability of the adjoining properties.
- Cast iron was jointed like timber (mortice and tennon etc) or bolted but not riveted. Wrought Iron I sections could not be more than 300mm deep in a single piece. Deeper sections had to be riveted or bolted. Mild steel could be bolted or riveted but was not welded until after the 1950s.