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## Knocking off fragments of damaged stone as a preventive measure? The case of rusticated masonry at the Dreilinden estate in Lucerne

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The practice of removing or knocking off fragments of stone damaged by scaling and fracturing is a widespread preventive conservation measure. It is typically done to avert injury to passers-by. Normally, the practice is part of urgent measures within a comprehensive conservation programme, but it is also undertaken as a stand-alone measure when budgets are tight or knowledge of modern conservation principles lacking. Dreilinden estate in Lucerne provides an excellent example of this practice. In particular, the example shows what can happen when well-meant measures are not preceded by a due risk analysis.

The Dreilinden estate constitute three stone buildings forming part of a late 19th century English landscape park on the hills east of Lucerne city centre. Since 1952 hosting the Lucerne School of Music the ensemble achieved cantonal protection status in 1984. The so-called "economy building", originally the stables of the estate, was renovated in the 1970s, but the exterior façades were left untouched. It is a majestic "English style" building, its façades constructed entirely from small-scale rusticated ashlar (or irregular coursed rubble) masonry. A small molasse sandstone quarry at the precincts seems to have provided the majority of stone – a stone that typically develops scales and fissures when strongly exposed to the elements.

Very few damages can be observed on photos from 1926 and 1975, yet it is likely that minute scales and fissures started to develop relatively early. Though no close calls have been recorded, by the mid 1990s it was believed that partially loose stone fragments, some of which had already fallen off, presented a risk to passers-by. A programme of knocking off pieces started and was intensified by 2005. Perhaps as a result of the slightly more hazardous situation at the nearby main building of the estate, at this stage the programme involved removing virtually every stone surface displaying scales and fissures, whether posing a risk to passers-by or not. More than 1000 stones at the two most exposed façades were affected. They lost 40 m<sup>2</sup> or almost 10% of their surface.

A potential safety problem was thus (at least temporarily) solved, but new problems were simultaneously introduced. First, a most significant stylistic trait of the building – the rustication – was impacted on by the creation of large, "flat" façade parts. Second, options for future conservation were effectively reduced. It is now possible to leave the knocked-off areas as they appear, to remodel using mortar or to replace fragments and entire stones with new ones. The important option of fixing partially loose fragments is, obviously, not feasible anymore. Third, dependent on future conservation concept (yet to be developed), repairs may become more expensive than as compared to a situation in which the hundreds of fragments posing no or extremely low risk to passers-by had been left on the building.

It seems fair to conclude that an originally sound safety measure continued without reference to the actual risks at hand, neither to future conservation. In the heat of everyday conservation work this is a common problem: "When we replace this stone it is necessary to replace this one, too" – or what William Murtagh calls "creeping reconstruction": the tendency of small repairs to ever expand without a clear idea of conservation concept and problems to be solved. Adding that the fear of injuries will have played a significant role, the "creeping demolition" at Dreilinden can be seen in a similar perspective. A sound conservation concept based on risk analysis is aimed at in the current project, started in late 2008.

**References**  
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The "economy building", originally the stables of the Dreilinden estate in 1926, seen from the south. Photo: Fotograf Gustaedt. Stadtarchiv Lucerne.



The "economy building" seen from the west with its two largest and most damaged walls in 2009. Lighter stones had their surfaces knocked off mainly in 2005 and 2006.



A heavily exposed part of the west façade in 2009. A few fragments (scales) had fallen down by 1975. The rest was knocked off mainly in 2005 and 2006 (light – coloured stones).

The current conservation project at Dreilinden is in the conceptual phase. It has involved the City Administration of Lucerne (Project leader: Andreas Madoery), the Cantonal Heritage Authority, Schenkel Vermessung AG in Zurich, ibid Altbau AG in Winterthur, the Restoration Workshop of Berne Cathedral and Conservation Science Consulting Sàrl in Fribourg. Authors' e-mails: [storemyr@conservation-science.ch](mailto:storemyr@conservation-science.ch), [blaeyer@conservation-science.ch](mailto:blaeyer@conservation-science.ch)

Below: Maps of weathering phenomena at the NW and SW façades. Knocked-off stone fragments are marked with red. Maps produced using GIS.

