

# Bringing millstones to America: 19th century use of Norwegian mica-schist millstones in the United States

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**Abstract:** Norwegian mica-schist millstones are preserved at two sites in the upper Midwest of the United States, the Vesterheim Norwegian-American Museum in Iowa, and Beckman Mill in Wisconsin. Based on their mineral composition, the stone for these millstones was quarried at two classic Norwegian mica-schist millstone quarry regions, Hyllestad and Selbu. These millstones were brought to the American Midwest at a time when commercial mills were scarce and when wheat was a key crop.

**Keywords:** Beckman Mill, Hyllestad, mica-schist millstones, Selbu, Vesterheim

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## Introduction

Transport of mica-schist millstones from Norway dates from the Viking Age. Such millstones were used in neighboring countries in Europe and brought to Iceland and other islands to the west of Norway (Carelli and Kresten 1997; Baug 2006; Baug and Jansen 2014). Norwegian mica-schist millstones were also brought to North America by Norwegian immigrants in the 19th century, as many such immigrants found their way to the upper Midwest of the United States, especially to Wisconsin, Minnesota, Iowa, and northern Illinois (Holand 2006).

Norwegian mica-schist millstones are now preserved at the Vesterheim Norwegian-American Museum (hereafter referred to as Vesterheim) in Decorah, Iowa, and at Beckman Mill in Rock County, Wisconsin (Fig. 1). Both Decorah and Rock County were important



Fig. 1: Map highlighting Minnesota, Iowa, Wisconsin, and northern Illinois in the USA, as well as key cities, towns and sites noted in the text. Localities with Norwegian mica-schist millstones are indicated with stars.

centers of Norwegian immigration. In two cases, records indicate that individual emigrants brought these stones to America. It was a time where there was a need for these stones, as millstones were not readily available, and mills were scarce in the inland areas where Norwegian emigrants settled and grew crops such as wheat.

Illinois became a state in 1818, and the first Norwegian settlers arrived in about 1834 (Norlie 1925, 152). The first Norwegian settlements in what is now Wisconsin were established in 1838 and the first Norwegian settlement in Iowa was in 1839. These settlements were founded soon after, and even during, the time when native peoples of the old Northwest had been subjugated and in great part extirpated. The Black Hawk War, which began in Illinois and extended into Wisconsin, had just occurred in 1832, and that did not end conflict in the region (Wisconsin Cartographer's Guild 1998, 14-15). Iowa did not become a state until 1846, Wisconsin only became a state in 1848, and Minnesota became a state 10 years later in 1858. In the 1840s and 50s, Wisconsin became the center of Norwegian settlement (Lovoll 1984, 36). By 1860 nearly half of all Norwegian immigrants in the United States lived in Wisconsin (Wisconsin Cartographer's Guild 1998, 20). Many Norwegian immigrants established farms at this time, when wheat was the most commercially important crop grown in the state, and wheat's importance in Wisconsin would continue into the 1870s (Wisconsin Cartographer's Guild 1998, 42). Wheat was also a key crop in the surrounding region at this time. In neighboring Iowa, wheat production rapidly increased during the 1840s, 50s and 60s (Swisher 1940, 188-189). Therefore, there was an immediate need for mills and millstones for grinding wheat and other grains.

The Norwegian emigrants who brought these millstones with them thought that millstones were unavailable where they were heading (Nelson 2008, 1; Vesterheim Norwegian-American Museum 2015, 9). These millstones would indeed prove to be useful. The first mill in the western part of what was called the old Northwest was constructed only in the 1810s at Prairie du Chien in what is now westernmost Wisconsin (Anonymous 1929). Mills were established only in the 1830s in Iowa, and these were 'small, crude, and inefficient' (Swisher 1940, 15). Despite this inefficiency, a small two-person hand mill built in 1837 in Cedar County, Iowa, was deemed so critically important that it was dubbed the Little Savior (Swisher 1940, 32). It was the 1840s when Milwaukee, Wisconsin, located on Lake Michigan, began its short-lived rise as a milling center. The first commercial mill in Decorah, Iowa, a center of Norwegian immigration, was opened only in 1849 (Johnson and Hippen 2006). And the first commercial mill in Stoughton, Wisconsin, another such center, was built only circa 1850 (Homme 1947, 27-28). Even when there were commercial mills, millers were backed up seasonally, and the sacks of grain awaiting milling

were nibbled into by rats and mice (Bailey 1913, 246). Because of the dearth of commercial mills, various enterprising individuals, including at least one Norwegian immigrant, in these areas carved millstones out of local boulders, as well as local bedrock to power home-made handmills in the 1830s into the 1850s (Bailey 1913; Swisher 1940, 32-33, 60, 215).

The use of Norwegian mica-schist millstones in America is not well known. This is in contrast to conglomerate from Great Britain, basalt from Germany, and chert (French buhr; meulière) from France, which are better known (Hockensmith 2009, 120-122). The purpose of this paper is to describe examples of these Norwegian millstones at Vesterheim and Beckman Mill, and, based on their petrological characteristics, trace them back to the regions in Norway in which they were quarried.

The present study follows intensive ongoing investigations of millstone quarrying and mica-schists in Norway (e.g., Baug 2006; Grenne *et al.* 2008; Heldal and Meyer 2011; and Engvik *et al.* 2014), especially at two major sites, Hyllestad and Selbu (Fig. 2). These studies have facilitated comparison of the material in the United States to their source rocks in Norway.

## Materials and methods

Two pair of mica-schist millstones were studied at the Vesterheim in Iowa and one pair at Beckman Mill in Wisconsin. The Vesterheim is located in downtown Decorah, Iowa. Decorah has been noted as 'the first great center of Norwegian pioneer

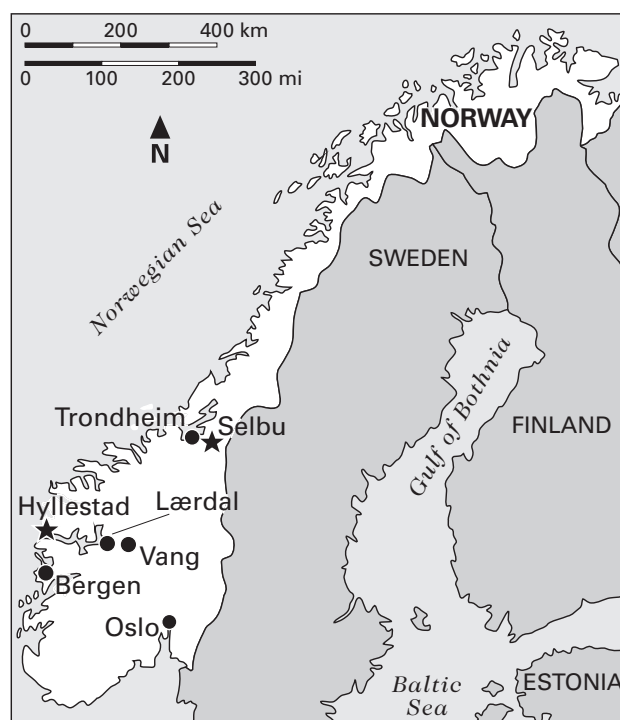


Fig. 2: Map showing key localities in Norway noted in the text. Quarry areas at Hyllestad and Selbu are indicated with stars.



Fig. 3: Norsvin Mill (LC5990) at the Vesterheim Norwegian-American Museum, Decorah, Iowa. Mill has a groundplan of 2.6 m (8 ft, 5 in) by 2.3 m (7 ft, 7 in).

settlement west of the Mississippi' (Gjerset 1931, 153). Beckman Mill (also known as the Beckman-Howe Mill) is located in Beckman Mill County Park, a Rock County, Wisconsin park, about 10 km (6 miles) west of the city of Beloit, Wisconsin.

Rock County was a magnet for Norwegian immigrants, beginning at the end of the 1830s, and this county was also the embarkation point for Norwegians into the rest of Wisconsin and the rest of the old Northwest (Norlie 1925, 158). All of the stones studied are monolithic, and more discoidal in shape than are 'typical' millstones used in America. None of the stones studied have any numbers or letters carved into their tops to indicate where they were quarried.

One pair at Vesterheim is housed within the Norsvin Mill (Fig. 3), a small Norwegian water-powered mill building on the grounds of the Museum. The other pair studied is now stored, along with millstones of various other stone types, in the much larger Painter-Bernatz Stone Mill on the Museum grounds.

The millstones at Vesterheim were studied on Oct. 24, 2014, and May 16, 2015. Accession numbers for the Vesterheim millstones begin with the initialism LC which indicates that the millstones belonged to Luther College before the collection became independent as Vesterheim in 1967.

One pair of mica-schist millstones was studied at Beckman Mill. Millstones at Beckman Mill were studied Oct. 16, 2011, Oct. 27, 2014, and May 22,

2015. The accession number for these millstones is that of the Rock County Historical Society.

The millstones or portions of these millstones, were cleaned using water and/or a soft brush as necessary for study and photography, examined with a hand lens and/or binocular field microscope, measured, and photographed. No samples were taken. Attributes of these stones are listed in Table 1.

Attempts were made to locate additional Norwegian mica-schist millstones in the United States by visiting or contacting historical societies and other institutions in areas settled by Norwegians during the nineteenth century, especially sites in Wisconsin, Minnesota, Iowa, and northern Illinois, but also including sites as far away as California. No mica-schist millstones were located at these other sites, although, of course, the possibility certainly exists that more examples are extant.

### **Muscovite mica-schist millstones from Hyllestad**

The pair of handmill-size mica-schist millstones (LC5990; Figs 4-5) in the Norsvin Mill at the Vesterheim are about 57 cm in diameter. Because of their size they can also be called quernstones as per the terminology of Haldal and Meyer (2011, 326). The top surface of the runner stone is in the shape of a low cone, like that seen in Haldal and Meyer (2011, fig. 4b), but not like the distinctively





Fig. 4: Pair of muscovite mica-schist millstones (LC5990) inside Norsvin Mill. Scale is marked in 1-dm increments. The runner is laid directly on top of the bedstone.



Fig. 5: Closer view of muscovite mica-schist millstones in Norsvin Mill. Scale and right side of millstones are foreshortened in the photo.

bell-shape runner stones also known from Hyllestad (Grenne *et al.* 2008, 61, fig. 28). The bottom of the runner has an inset for a simple rynd (metal crossbar that would have straddled a spindle when in use) and the bottom also has grooves cut into it. Color of these millstones is light gray (Munsell N7).

These millstones are composed of garnet-kyanite-muscovite mica schist. Prominent garnet porphyroblasts contrast with a groundmass composed of mostly small crystals of muscovite and amorphous quartz (Fig. 6). Most garnet crystals are sub-euhedral and between one and two mm in diameter, but some are larger. The millstones also contain kyanite (Fig. 7), white to very light gray in color with flashes of blue. Fibrous masses of kyanite can exceed the size of the garnets. Muscovite crystals in the groundmass are generally much smaller than are the garnet porphyroblasts. This mineral assemblage indicates an origin in the Hyllestad area quarries (compare Fig. 6 with fig. 7 in Grenne *et al.* 2008). The presence of kyanite along with garnet in a mica-schist has been considered

definitive for a Hyllestad origin (Baug and Jansen 2014, 252). Provenance can be narrowed down even further, however. The sub-euhedral shape of most of the garnets and the presence of quartz indicates that this stone was probably quarried in the eastern part of the quarry area at Hyllestad.

There is an unusually large amount of historical information on this pair of millstones, tracing them step-by-step from the place that they were purchased in Norway to the places where they were used in the United States. These stones are noted in a number of sources published in English and Norwegian (Gjerset 1931, 157; Semmingsen 1980, 58; Haugen 2008). Knut Norsvin (circa 1809-1880, whose name has also been spelled Norsving) brought the millstones from Norway. Norsvin was a well off and influential Norwegian who left Norway because of dispute involving the moving of a historic church. In preparation for leaving he decided to purchase a set of millstones as he thought they might not be available in the United States (Nelson 2006; Haugen 2008).

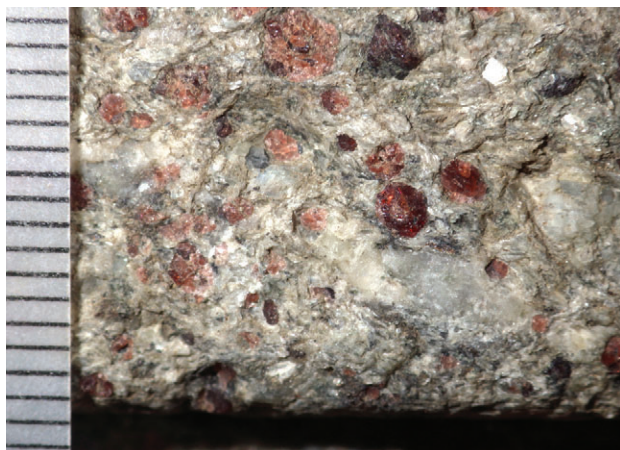


Fig. 6: Close-up of side of muscovite mica-schist runner stone in Norsvin Mill, showing euhedral and subeuhedral garnets, some in three dimensions. Scale in mm.

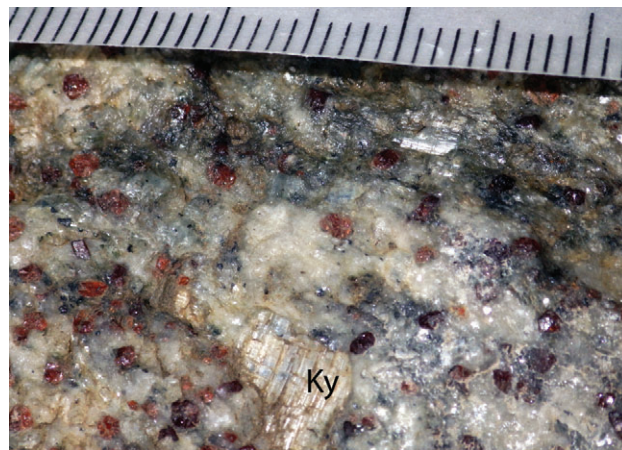


Fig. 7: Close-up of muscovite mica-schist runner stone in Norsvin Mill, containing prominent kyanite (Ky) as well as garnets, quartz and muscovite. Scale in mm.

Norsvin traveled from his home in Vang in Valdres, Norway, to Lærdal to purchase the stones (Fig. 2). At this time Lærdal was a regionally important market town easily accessible from Hyllestad by water (Gurli Meyer, pers. comm. 2015). Quarries at Hyllestad were advantageously located along a fjord for easy water transport (Heldal and Meyer 2011, 325, fig. 3). The size of the millstones, with a diameter of about 57 cm, was near the boundary of 60 cm that divided smaller millstones intended for use in handmills from larger millstones intended for use in watermills (Heldal and Meyer 2011, 326). It is likely that Norsvin chose this size so that the stones could be used either in a watermill or in a handmill as the need might arise in the new country. After purchase, Norsvin would have transported them by pack horse to Vang and then Christiana (today's Oslo), a point of departure for America (Gurli Meyer, pers. comm. 2015). He may have also brought a mill with him.

Gjerset (1931, 157-158) describes Norsvin's movements once he arrived in America in 1849. Norsvin first spent about two years in eastern Wisconsin near Milwaukee, and then moved to Stoughton, Wisconsin, an area with a then-burgeoning Norwegian population. In 1859, Norsvin moved to northeastern Iowa, another area of Norwegian settlement. He settled in Madison Township, Winneshiek County, Iowa, immediately west of Decorah. Finally he moved to Goodhue County, Minnesota. Gjerset (1931, 158) notes that Norsvin used the millstones to grind grain and malt in Iowa and that he and his son Borge Norsving used these millstones again in Minnesota.

Based on the shape and composition of these millstones, the history of Knut Norsvin, and the availability of stone at the time Norsvin emigrated to America, Haugen (2008) determined that the stone originated at Hyllestad. The mineralogy of the millstones confirms Haugen's determination.

The Norsvin Mill (LC5990) in which the millstones are now housed is not a structure used by Norsvin. The present mill was brought from Norway by

Knut Norsving (one of the variant spellings of the family name), a grandson of Norsvin, who located the small mill in the vicinity of Vang, Valdres, probably at Kongslien (Gjerset 1931, 158; Haugen 2008; Vesterheim accession record for LC5990), in 1925 and had it shipped to Iowa to accompany the millstones that his grandfather had brought from the old country many decades before (Nelson 2006, 8).

## Biotite mica-schist millstones from Selbu

Two pair of biotite mica-schist millstones were studied. A pair at Beckman Mill has a label indicating provenance in Norway; the other biotite mica-schist pair at Vesterheim does not have associated historical information. Their mineral content indicates an origin in Selbu.

## Biotite mica-schist millstones at Beckman Mill

The pair of biotite mica-schist millstones at Beckman Mill consists of two quernstone-size millstones, 53 and 54.5 cm in diameter. They are associated with a small, wood-frame handmill (Fig. 8), confirming their identification as quernstones. A well-worn wooden frame (Fig. 9), presumably original, accompanies the stones; the remainder of the frame of this handmill is a reproduction made in the 1930s.

The pair at Beckman Mill consists of a runner stone with a low-cone shaped top (Fig. 10) and a bottom (Fig. 11) with a simple inset area, slightly expanded distally, for insertion of a simple crossbar rynd. The millstones are composed of medium dark gray (Munsell N4) to brownish gray (Munsell 5YR 4/1) colored biotite-mica.

The millstones are studded with staurolite porphyroblasts (Fig. 12), dark brown in color and





Fig. 8: Handmill (1952.37) inside Beckman Mill, Beckman Mill Park, Rock County, Wisconsin. Bedstone: 54.5 cm in diameter.



Fig. 9: Biotite mica-schist bedstone (1952.37B), surrounded by well-worn, presumed original housing. Scale 50 cm.



which appear blocky to prismatic in crystal form. Many are twinned but the twinning is somewhat masked, as the top surface of most of the porphyroblasts are ground down to a more-or-less smooth surface. These porphyroblasts give the stone a 'knobbly' texture similar to the stone as seen in outcrop in Norway (Grenne *et al.* 2008, 48; Heldal and Meyer 2011, 325; Engvik *et al.* 2014, fig. 3a). The stone is similar in color and texture to weathered schist illustrated (Grenne *et al.* 2008, fig. 16) as occurring at the Selbu quarries. The stone quarried in this area is part of the Gula Complex, a part of the Caledonian Upper Allochthon (Engvik *et al.* 2014).

When lit with oblique light (Figs 11-12), a pattern of irregularly circular ridges can be seen protruding from the milling surfaces of the stones. The ridges are

composed of shorter curved segments of protruding staurolite porphyroblasts accompanied by mica-schist tails (Fig. 13). These features resemble (but are only superficially related to) small flute casts. Differential hardness of the porphyroblasts vis-à-vis the ground mass of the millstones produces these ridges, which are a distinctive feature of Norwegian mica-schist millstones not found on other types of millstones used in North America.

There is a label with the millstones and associated wooden mill stating that the millstones were originally brought from Norway in the 1840s. It also indicates that the worn wooden frame that embraces the millstones was probably original and the rest of the mill 'was reconstructed in the 1930s from old lumber.'



Fig. 10: Top of biotite mica-schist runner associated with handmill (1952.37C) in Beckman Mill. Scale 50 cm.



Fig. 11: Bottom of biotite mica-schist runner associated with a handmill in Beckman Mill (photographed inside Beckman Mill). The surface is obliquely lit to show distinctive circular wear pattern. Scale 50 cm.

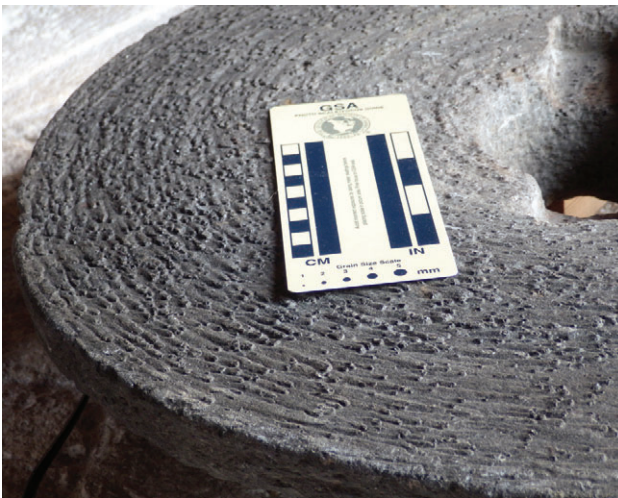


Fig. 12: Detail of the grinding surface of a biotite mica-schist millstone at Beckman Mill showing detail of flute-cast-like forms. Scale in cm left and inches right.



Fig. 13: Close-up of biotite mica-schist runner at Beckman Mill, showing staurolite porphyroblasts. Millstone is obliquely lit so as to show detail of flute-cast-like forms.



## ***Biotite mica-schist millstones at Vesterheim***

The pair of biotite mica-schist millstones at Vesterheim (LC7561; Fig. 14) consists of two quernstone-size millstones 48 cm in diameter. The runner stone (Figs 15-17) of this pair has a hole where a handle would have been inserted into the millstone, confirming its use in a handmill. The top of the runner has a low cone shape. The bottom of the runner has a simple central inset area (Fig. 17) for a simple crossbar rynd. The bedstone (Fig. 14, left) has 10 radial grooves and a wooden plug in its center.

The stone is brownish gray (Munsell 5 YR 4/1) in color. The dominant porphyroblasts are staurolite and the crystals are mainly prismatic. Porphyroblasts give the stone a 'knobbly' texture.

Foliation as that seen at Selbu is also apparent (Fig. 18) in these millstones. This pair is similar in general form, color, and petrology to the biotite mica-schist millstone pair at Beckman Mill. The millstones are also similar, but not identical, in morphology (details are seen in the figures and in Table1).

The pair of biotite mica-schist millstones at the Vesterheim have no associated historical information, but their petrological characteristics are those of stone from Selbu.

Based on their general similarity with the biotite mica-schist millstones at Beckman Mill, which do have associated information, plus the good documentation for the muscovite mica-schist millstone pair at the Vesterheim, there is a good

probability that the biotite mica-schist millstone pair at the Vesterheim was also brought to America by Norwegian immigrants in the mid-1800s.

Could Norwegians immigrants have used American mica schist for millstones?

At least one other Norwegian emigrant brought mill-related material to North America and used it, but with millstones that he fashioned from local stone. Lars L. Iverson brought mill irons when he left his home in Voss, Norway, in 1852 and settled in Canoe Township, not far from Decorah. Because of the long wait for milling at the scarce mills in the region, he carved his own millstones made of local stone (Iverson 1877; Bailey 1913, 246). These stones (LC5991) are not mica-schist, however. They are made of sedimentary rock, are not discoidal, and are roughly edged and not as well made, as are stones imported from Norway.

There are outcrops of schist in the upper Midwest of the United States, however. This includes a kyanite schist found at Powell, Wisconsin. The kyanite in this schist is associated with biotite layers, not muscovite as in the case of the mica schist from Hyllestad. No mention or indication of any millstones made of this or any other North American schist were encountered during this study.

## **Postscript: end of an era**

Soon after mid-century, only a few decades after the arrival of the earliest Norwegian immigrants to the Upper Midwest, large-scale commercial mills



Fig.14: Pair of biotite mica-schist millstones at Vesterheim (LC7561). Bedstone (left) has a wooden plug in its center. Scale 50 cm.





Fig. 15: Biotite mica-schist runner stone at Vesterheim. Scale 50 cm.



Fig. 16: Oblique view of top of biotite mica-schist runner stone at Vesterheim. Scale 50 cm.



Fig. 17: View of bottom of biotite mica-schist runner stone at Vesterheim. Scale 50 cm.

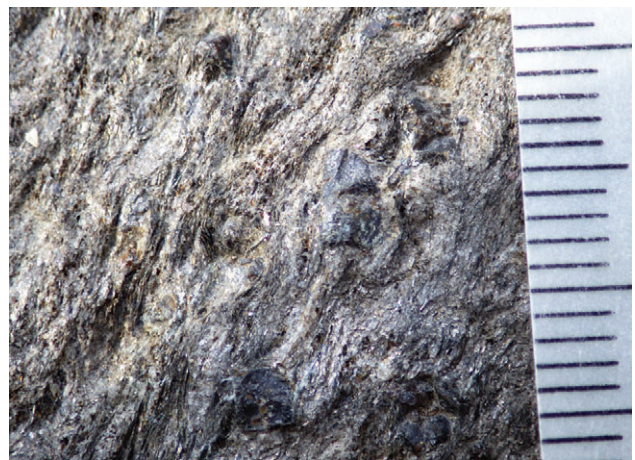


Fig. 18: Close-up of biotite mica-schist runner stone at Vesterheim showing foliation. Scale in mm.

proliferated, reducing the need for smaller, less efficient mills. These commercial mills used millstones made of imported French buhr, considered to be the best millstones in the world. Both the 1851 Painter-Bernatz Stone Mill in Decorah and the 1868 Beckman Mill in Rock County, Wisconsin, utilized French buhr millstones and such millstones are still present at these mill sites today (Hannibal 2017, this volume). A millstone outside of the Stoughton Historical Society Museum, across the street from Livsreise Norwegian Heritage Center in Stoughton, is also composed of French buhr. This millstone was used in the mill that Luke Stoughton, the town's founder, had built circa 1850.

Beginning in the 1870s, the wheat growing area of the country shifted westward, into the Dakotas, as did Norwegian immigration (Lovoll 1984, 83-86). By the 1880s Minneapolis, Minnesota, replaced

Milwaukee, Wisconsin (and St. Louis, Missouri) as the major milling center in the country and, it is claimed, the world (Frame 1978, 152). Decorah also became a major regional milling town (Swisher 1940, 87). And in the 1880s (Swisher 1940, 125, 137, 186), iron rollers began to take the place of French buhr in the upper Midwest. Mill complexes also grew larger, and the need for local commercial mills diminished.

The number of pioneer buildings, barns, and other structures built by Norwegian immigrants from wood in Iowa and Wisconsin have diminished over the years (Perrin 1967, 3-5; Perrin 1981, 8, 57). Norwegian mica-schist millstones, however, remain as the most durable remnants of a time when Norwegian emigrants travelled to America, and when wheat was a dominant crop in these states now known for corn (Iowa) and dairy (Wisconsin) products.

## Conclusions

This study confirms that Norwegian millstones were brought into the heart of North America by Norwegian immigrants. Their mineral composition verifies historic records for two pair originating in Norway and indicates that the third pair, lacking associated historic information, also originated in Norway.

The composition of these stones indicates that they were quarried at Hyllestad and Selbu, two major quarry areas in Norway. The transport by individuals from Norway to America is much like the situation hypothesized by Baug and Jansen (2014, 253) for the transport of Norwegian millstones by individuals (travelers or settlers) to Iceland and the Faroe Islands in the Viking Age, eight hundred years before.

Other such mica-schist millstones may exist in North America. The descriptions and illustrations in this paper should help in their identification. Special attention should be paid to discoidal millstones, as those are more likely to be of Norwegian origin, than are relatively thicker millstones.

## Acknowledgements

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Table1. Norwegian millstones in North America.

Stone type, location, and accession no.	Dimensions	Stone color (Munsell 2009)	Predominant porphyroblasts / inclusions	Remarks
muscovite mica-schist; Vesterheim, Decorah, Iowa; LC5990	Both about 57 cm diameter; runner stone about 5 cm high; bedstone 3 cm high	light gray (N7)	garnet, kyanite, quartz	runner stone top a low cone shape, stub of small metal rod set into top, bottom of runner with carved furrows, incised spaces for insertion of simple crossbar rynd carved into bottom
biotite mica-schist; Beckman Mill, Rock County, Wisconsin; 1952.37B (bedstone) and 1952.37C (runner stone)	runner stone, 53 cm diameter, 8.5 cm high; edge 3-3.5 cm high, central hole 10 cm wide; bedstone 54.5 cm diameter, 3.5 cm high, central hole 9 cm diameter	medium dark gray (N4) to brownish gray (5YR 4/1)	staurolite	runner stone top a low cone shape, incised spaces for insertion of simple crossbar rynd carved into bottom, space slightly expanded distally
biotite mica-schist; Vesterheim, Decorah, Iowa, LC7561	both stones 48 cm diameter; runner stone 10 cm high, bedstone 6 cm high	brownish gray (5YR 4/1)	staurolite	runner stone top a low cone shape, incised spaces for simple crossbar rynd carved into bottom, hole near perimeter (for handle) perforates stone, several shallow notches or chipped areas along perimeter; bedstone has 10 radial furrows, and wood insert in central hole.



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