

STAHLMANN'S CELLARS: A LARGE AMERICAN LAGERING CAVE FROM THE NINETEENTH CENTURY

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As a geologist, my personal interest in brewery caves and lagering cellars began, not so much with a curiosity in brewing history itself, but while investigating the local geology and the use of underground spaces, both natural and artificial, in the state of Minnesota, USA. This was a topic upon which I later published an entire book and brewery caves are the subject of one of its chapters.¹

From the 1840s onwards, German immigrants to the United States brought with them a traditional fondness for beer, which had not previously been of great importance in the latter country, where hard liquors were usually preferred - something that has been called the 'beer invasion'.² Ironically, this invasion was apparently facilitated not only by the burgeoning German population, but also by temperance agitation, which originally focused largely on 'ardent spirits', leading many Americans to choose the less potent beverage.³

Prior to 1840, there were no breweries in America producing the German-style lager beer.⁴ Lager beer differed from the prevalent English and American beers, such as ale, in that the lager yeast fermented at the bottom of the vat, rather than the top, and the beer required lagering, or storage, for several months at lower temperatures. In the old days, lager beer could only be brewed during the winter months, when cellar temperatures were sufficiently low.⁵ But in northern states, such as Minnesota, where natural ice was readily available, ice cakes could be harvested from nearby lakes and rivers in winter and stacked in caves, allowing brewing year round to meet the growing demand.⁶

Minnesota's first brewery to produce lager beer was established in 1848 by Anthony Yoerg in the state's capital city, St. Paul. Yoerg, like many St. Paul brewers to come, was a native of Bavaria, the cradle of the German brewing industry.⁷ Several years later another important brewer, Christopher Stahlmann, arrived in the city.

Stahlmann's Cave Brewery

Thomas Newson, in his *Pen Pictures* (1886), described Stahlmann thus:

He was born in Bavaria in 1829; came to the United States in 1846 and ... removed to ST. PAUL in 1855, and erected his brewery the same year. He was a member of the House of Representatives in 1871 and in 1883; was [Ramsey] County Commissioner in 1871, and held several other minor offices.

Describing Stahlmann's commercial enterprises in more detail, Newson added that

In early days he went out to what was known as the old Fort road, now [West] Seventh street, and purchased several acres of land there and built his brewery thereon. These acres were then considered away out of the city, but are now within the city limits and very valuable.⁸

Stahlmann was indeed 'one of the greatest pioneers of the West End' of St. Paul.⁹

With the growth of the beer market following the American Civil War (1861-65), Stahlmann's Cave

CAVE BREWERY

CHR. STAHLMANN, Prop'r.

ESTABLISHED 1838.

COR. FORT AND ONEIDA STREETS,
SAINT PAUL, MINN.

The Most Extensive Brewing Establishment
IN THE STATE OR THE NORTHWEST.



The following shows the rapid increase of business by the number of barrels brewed in the last few years:

1870.....	1,465
1877.....	8,415
1878.....	10,440

**THE FINEST QUALITY OF
LAGER BEER**

IN
KEGS OR BOTTLES

Shipped to any part of the United States and warranted to keep in any climate.

Delivered to any part of the city free of charge. Orders by mail or other wise solicited and promptly attended to.

Figure 1. Advertisement from R. L. Polk, St. Paul City Directory for 1880/81.

Brewery, as it was known (Fig. 1), became the largest brewery in Minnesota, with an annual production of 10,000 barrels by the late 1870s. By 1884, his production peaked at 40,000 barrels per year, but by that time Stahlmann was no longer in first place.¹⁰

As the name 'Cave Brewery' suggests, Stahlmann carved an extensive lagering cave, still known as 'Stahlmann's Cellars', below the brewery. A newspaper reporter, in 1877, described the cave during its heyday:

Armed with candles, and conducted by Mr. Stahlmann, the visiting party started down, down into the bowels of the earth; down through the strata of solid lime stone rock which underlies all that section, and of which the buildings are built, we went until we struck the underlying strata of sand rock, fully sixty feet below the surface. Here were the cellars -

cellars to the front, the right, the left, and the rear - in all over 5,000 feet, or nearly a mile in length, and still the work of excavating new chambers is going on. These cellars are about 16 feet wide and ten feet in height. In them now are some 120 huge butts of different varieties of beer, in all over 3,000 barrels. The butts are in chambers, six or eight in a line, each group backed by a huge chamber of ice to keep them at proper temperature, in all over 6,000 cakes of the three foot Mississippi ice now being in store. Such complete cellars, dry, fresh and clean, we venture cannot be found elsewhere in America ... Fortunately Mr. Stahlmann has an inexhaustible supply of the purest of spring water. It is brought in pipes from the bluffs, and carried into every floor of his private residence, feeds the boilers, runs through his cellars, all over the brewery and malt house, and is finally discharged into a sewer with the general refuse, which is discharged into the Mississippi through the cave.¹¹

Several years later, in 1883, another account of Stahlmann's Cellars was provided by John Land, in his *Historical and Descriptive Review of the Industries of St. Paul*:

It takes three-quarters of an hour constantly walking to traverse these subterranean caverns, or rooms. The works under ground cost \$50,000, and are more wonderful in their aptitude and construction than the building above the ground, and where the most of the work is done. It is a perfect labyrinth of rooms and cellars, and under cellars three deep, reminding one of the catacombs of Rome, for none unacquainted with these subterranean vaults, without a guide, could grope their way through them and find their way out to daylight. We, with our guide, taper in hand, descended the first flight of stairs, and after meandering through their various ramifications, came out to the light of day one mile from where we descended.¹²

Atmospheric accounts like these, characteristic of the times (Fig. 2), influenced later writers, until Stahlmann's Cellars acquired a national reputation as the very type of labyrinthine complexity, which it still held more than a century later.¹³ As noted by art historian Susan Appel, 'the breweries with the best and most extensive cellars became the most famous'.¹⁴

Here are the facts: Stahlmann's Cellars were carved in the St. Peter Sandstone, locally known as 'sandrock', which is very soft and easily excavated, with the bottom of the overlying Platteville Limestone left to form a flat

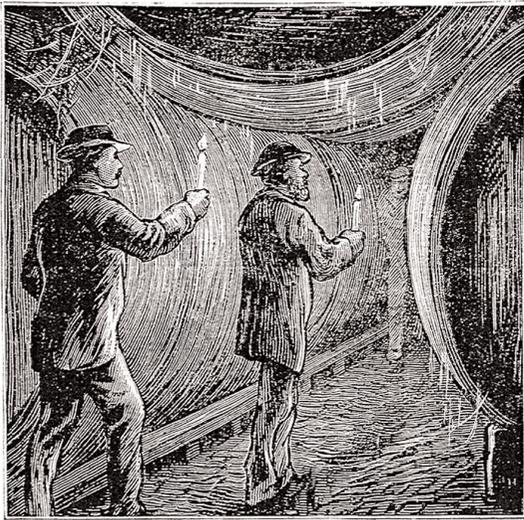


Figure 2. 'Traversing a cellar', from Frank Leslie's Popular Monthly, August 1882, p.213.

ceiling. The passage dimensions quoted above, '16 feet wide and ten feet in height', are accurate, but there appears to be only one level in the sandstone cave itself, despite the three that Land's description might suggest. A partial map of the cave, dated 1884 (Fig. 3), was traced onto the municipal sewer plats, and it shows

two grids of passages meshing at an angle. One grid, somewhat irregular, is aligned with Fort Road while the other, more rectilinear, is aligned with a real estate plat (Stinson, Brown, & Ramsey's Addition to St. Paul), making 1,400 feet of passages. Additional passages, under the present brewhouse, are shown on a different map, the 'Sub Basement Plan' (Fig. 4),¹⁵ but these date to a later era. The total length of passages is more like one-half mile, rather than the mile claimed in the old accounts. Even so, the Stahlmann maze is more extensive than any other brewery cave in Minnesota, in this writer's experience of such spaces.

However, the use of caves to trap cold winter air or to fill with ice for lagering was becoming obsolete by the 1870s, when brewers began to build icehouses, which 'took the aging of lager beer out of caves and placed it in an aboveground stack of "cellars" cooled by a massive body of ice at the top of the building'.¹⁶ The construction of icehouses bypassed the arduous task of underground excavation. And with the widespread adoption of mechanical refrigeration in the 1880s, ice-making machines freed brewers from dependence on natural ice with its uncertainties of supply and price. The icehouse thus evolved into a mechanically refrigerated stock house, where temperatures could be even more scientifically controlled. Eventually, mechanical refrigeration focused on generating cold

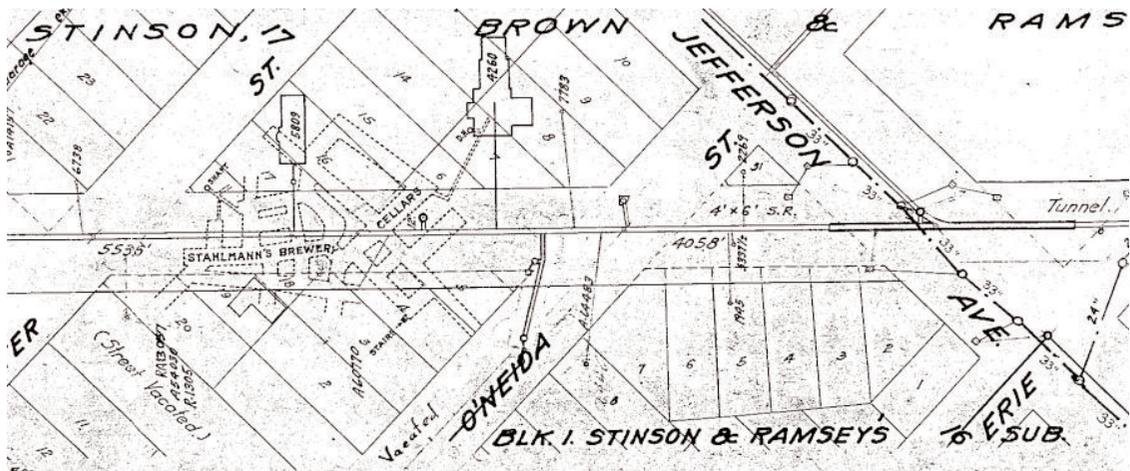


Figure 3. The 1884 map of Stahlmann's Brewery Cellars, from city sewer plats. Nearby sewer tunnels are shown, but this map omits many cave passages. Fort Road crosses the map from left to right. For orientation, Oneida Street runs north and south. The Stahlmann/Bremer mansion is depicted next to the word 'BROWN'.

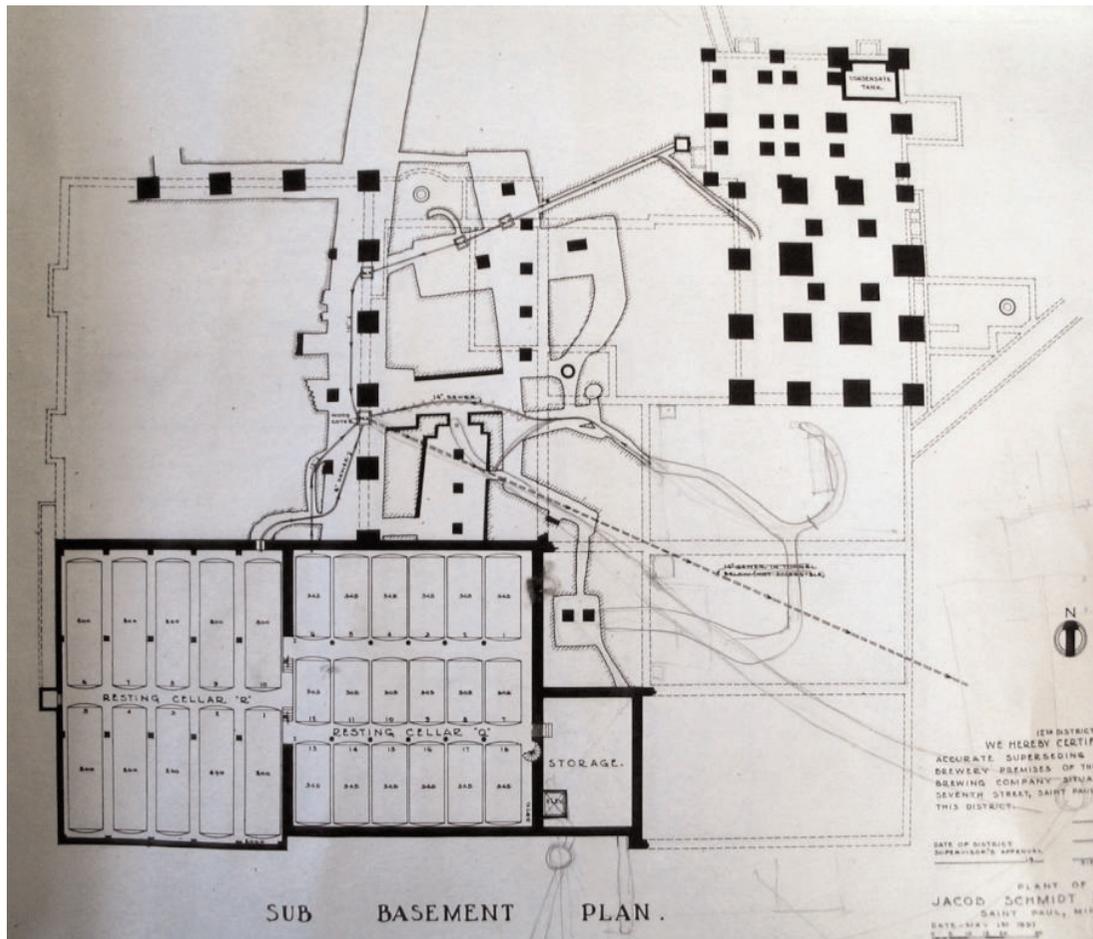


Figure 4. Map showing the maze of cave passages below the Schmidt brewhouse, whose outline is visible as a dashed line. The Palace Avenue Sewer and other passages have been sketched in by an unknown hand. The black squares represent brick piers.

air itself rather than ice, avoiding the bulkiness and messiness of ice.¹⁷

Examining the 1885 *Sanborn Insurance Atlas* for St. Paul, I found several icehouses depicted at the Cave Brewery, indicating that Stahlmann had begun converting to the newer refrigeration method at least by that year. These icehouses were built during the reconstruction of the Cave Brewery in the early 1880s.¹⁸ The lagering caves were thereafter, at some point, abandoned.

Another factor favoring the abandonment of lagering caves was the desire for cleaner facilities, following in

the wake of Pasteur's research into the so-called 'diseases' of beer.¹⁹ The Fort Street Sewer (as it is referred to in the original contracts) was carved under Stahlmann's Cellars in 1884 and intersects it at several points. As seen today, this sanitary sewer has an impact on the cave, into which it sometimes overflows. It's therefore unlikely that the cave was used much after 1884, despite Land's account from the year before. Indeed, the Stahlmann Cave Brewery was incorporated as the Chris Stahlmann Brewing Company in 1884 - without the cave moniker.²⁰

A further consideration, unique to Stahlmann's Cellars, is that there has been extensive ceiling collapse, leav-

ing a roller-coastering floor, so the cave isn't a good place to store anything. The collapse has been attributed partly to 'vibrations from above',²¹ and indeed, I observed that the passages completely truncated by collapse are the ones that extend under Fort Road, a major commercial artery with heavy truck traffic.

The Schmidt Brewery

Today, St. Paulites are more familiar with the Cave Brewery's successor, the great Schmidt Brewery, which towers over the Fort Road neighborhood like a magnificent red brick Rhenish castle (Fig. 5). Jacob Schmidt was born in Bavaria in 1845 and learned his craft at Milwaukee's famous breweries and elsewhere, ending up at the North Star Brewery on St. Paul's Dayton Bluff, which he effectively controlled by 1884. Meanwhile, Christopher Stahlmann had succumbed to 'inflammation of the bowels' in 1883, leaving the Cave Brewery in the hands of his competent sons, all of whom tragically perished, however, one after another,

from tuberculosis, leaving the brewery to go bankrupt in 1897. In 1900, Schmidt, seeking to replace the North Star Brewery, which had recently burned down, purchased Stahlmann's brewery.²²

Schmidt rebuilt Stahlmann's brewery in 1901-02 along the Oneida Street axis, with the help of Chicago architect Bernard Barthel, who employed 'the feudal castle style'.²³ By this time, however, progressive brewers regarded the use of caves for lagering as a sign of backwardness. In 1901, for example, Schmidt's chief local competitor ran a newspaper advertisement boasting,

The only brewery in St. Paul that has a modern refrigerating plant is Hamm's Brewery. Beer is stored in rooms kept at a temperature of 35 degrees. Light, pure air and absolute cleanliness help to make the beer pure and wholesome. No dark, ill-ventilated caves; temperature unchangeable and ventilation perfect. Insist on getting the honestly brewed HAMM'S BEER. Annual capacity, 500,000 barrels.²⁴



Figure 5. A fanciful moonlight view of the Schmidt Brewery from *The Book of Minnesota* (St. Paul: Pioneer Press Co., 1903), p.95.

Schmidt, whose North Star Brewery had depended on lagering caves at Dayton's Bluff, introduced mechanical refrigeration at the Stahlmann location. A 1901 article in a trade publication, reviewing Schmidt's new facility, reported that 'the refrigerating machine ... is furnished by the Fred W. Wolf Co., of Chicago'.²⁵

Jacob Schmidt died in 1910 but his able business partner, Adolf Bremer, together with the latter's brother, Otto, made the brewery one of the leading regional beer producers in the United States. With the passage of national Prohibition laws in 1919, the Schmidt Brewery began producing soft drinks and a successful near-beer named 'Select'. When Prohibition was repealed in 1933, Schmidt resumed the production of beer and within three years claimed to be the seventh largest brewery in the United States.²⁶ After several changes in ownership, involving acquisition by Detroit-based Pfeiffer's in 1955, then by LaCrosse-based Heilemann's in 1972, Schmidt ultimately became Landmark Brewery in 1991, operated by the Minnesota Brewing Company. The new owners considered giving tours of the underlying caves at the time,²⁷ but nothing came of the plan.²⁸

According to architectural historian Paul Clifford Larson, who conducted a study of the Schmidt Brewery in 2005,

The brewery industry was also a key player in the emergence of St. Paul from each of the major economic depressions between 1875 and 1930 ... The vigorous activity of the brewing industry at the turn of the century occurred in spite of a growing temperance movement in the state. Newspaper articles celebrating St. Paul's emergence from the economic depression listed every leading industry but the one that had made the most investment.²⁹

Indeed, brewing, a major local employer, has been called 'the West End's oldest and most dominant industry'.³⁰

Stahlmann's Cellars today

I explored Stahlmann's Cellars with fellow cavers in 1999 to examine its geological aspects, while the Schmidt Brewery above was still active, producing Pig's Eye Pilsner, named after 'Pig's Eye' Parrant, the supposed founder of the city of St. Paul in 1838. To get



Figure 6. Jelly stalactites in the Palace Avenue Sewer, 1999. After the brewery shut down, these living organisms died off.

there, we traversed the extensive sewer labyrinth under the Fort Road neighborhood, which connects with the cave. Carved in the sandrock, like the lagering cellars themselves, in the late nineteenth century, this labyrinth consists of 30 miles of narrow walking passages, and

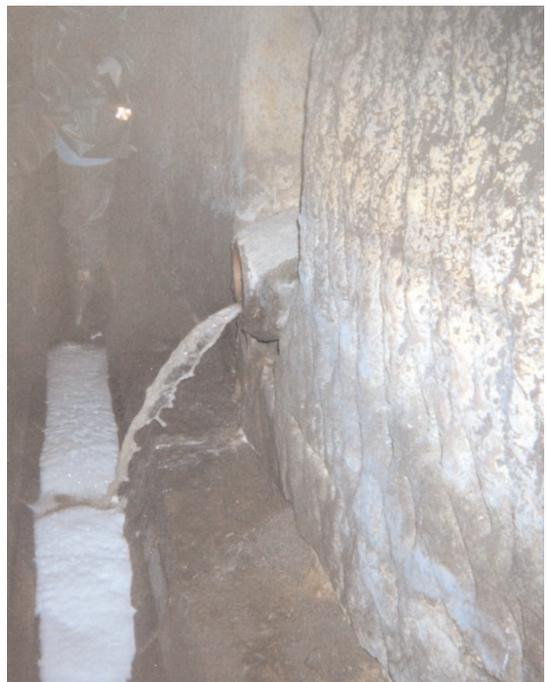


Figure 7. Beer waste draining into the Palace Avenue Sewer, 1999.

navigating the countless look-alike intersections could be tricky without a compass.

Following the sewer which drained the brewery, we entered a passage lined with quivering jelly stalactites, up to a foot long, dangling from the vaults (Fig. 6). This 'jelly' is well known to sanitation engineers as 'sewer slime', or 'pendant slime'. One such slime, examined under the microscope by researchers, was found to be the product of a bacterial-fungal combination that secreted a substance called 'zooglear matrix'. The dual organism derived its sustenance from aerosols generated from trade wastes at cascade points in the sewers (Fig. 7). The function of the copious slime is to absorb and concentrate nutritive substances from the atmosphere.³¹ Ethyl alcohol was found to be especially conducive to slime formation, and the role of the fungus is to provide a physical surface on which the bacterial slime producers can proliferate.³² One researcher dubbed them 'alcoholic slimes', which seems to fit best.³³ They are generically referred to in the more recent literature as 'biofilms'.³⁴

We finally came to the famous Stahlmann's Cellars. I slithered from a small clay sewer pipe into the enormous black void. My light illuminated a primeval forest of colossal yellow brick piers (Fig. 8), which were swarming with giant red cockroaches. Rats scuttled among the breakdown slabs on the cave floor. Festoons of vapor hung lazily in the warm, fetid air.

The square brick piers, the largest of which were six by six feet in size, supported the cave ceiling, and thus the tremendous weight of the Schmidt brewhouse above. The piers ran in rows, and from looking at the building's Sub Basement Plan, where they are represented by black squares (see Fig. 4), it can be seen that they were positioned inside the cave to be directly under the walls of the 1901 Barthel brewhouse, suggesting they were constructed after the Stahlmann era.³⁵ The south-trending cave passages end abruptly at a massive limestone rubble wall - the outer wall of the lowermost resting cellars - built-cellars on the same level as the cave itself.

Stahlmann's Cellars proper (as shown on the 1884 map) is located beyond the footprint of the Barthel brewhouse and thus lacks brick piers. Following the passage heading north from the brewhouse maze into

the main cellars, the dividing line between the two was nicely marked by a cold stream several feet wide and deep that crossed from one side of the passage to the other on its way to the Fort Street Sewer. This stream originated from the brewhouse water well. Shortly after crossing this miniature River Styx we arrived at the largest room in the cave, dubbed the Rotunda, from which passages radiate outwards in several directions.

The Rotunda is located under the brewery's Office Building. A nearby manhole, visible in the cave ceiling, provided access to the cave from the basement of this building, and was the preferred entry point to the cave for the occasional newspaper reporter. But as one such reporter glumly commented in 1993, 'Anyone who knew anything about those caves is long dead'.³⁶

One passage radiating from the Rotunda very much resembled a natural cave, containing stalactites more than a foot long and quite drippy, forming rows along the natural rock joints of the limestone ceiling. Beyond the stalactites, a trio of vertical well-pipes passed through the cave (Fig. 9). These are the wells that still supply the much frequented pump house on Fort Road, which has dispensed 'spring water' to the public for many years.³⁷

At the eastern extremity of Stahlmann's Cellars are a massive round arch of limestone rubble masonry and a stairway leading upwards toward Oneida Street. Now choked with boulders, these marked a former entrance to the cave (Fig. 10).

From the northern outskirts of Stahlmann's Cellars, a sandrock passage runs toward the original Stahlmann mansion, now known as the Marie Schmidt Bremer Home, an Italianate villa that was constructed circa 1870.³⁸ Under the mansion itself we found a mysterious shaft, its walls coated with white flowstone, a natural mineral deposit left by flowing water. With a diameter of three feet, this 30-foot shaft is large enough for a person to fit through, but its purpose is unclear. It brought to mind the kidnapping of the Schmidt brewer Edward Bremer by gangsters in 1934, after which the family reportedly dug a tunnel from the mansion to the Rathskeller (tasting room) across the street.³⁹ Could the white shaft have provided an alternate escape route for the security-conscious owners?



Figure 8. Colossal brick piers hold up the cave ceiling underneath the Schmidt brewhouse. Photo by Andrew Hine.



Figure 9. Passage leading off from the Rotunda, showing how cave-looking these lagering cellars become after more than a century of abandonment. Well-pipes visible in the distance. Photo by Andrew Hine.



Figure 10. A collapsed stairway inside Stahlmann's Cellars, once leading toward Oneida Street (see map, Fig. 3).

Stahlmann's Cellars is such a maze that we eventually became lost, despite having left rock cairns to mark the route, as the old polar explorers used to do. Until we learned the maze better I relied upon compass readings to navigate.

Three years after my exploration of these caves, in 2002, Landmark Brewery shut down. Gopher State Ethanol, the nation's first urban ethanol plant, which had begun production at the site in 2000, continued in operation until 2004, when it, too, shut down.⁴⁰ In 2006, we paid a return visit to Stahlmann's Cellars. It was an opportunity to see what changes, if any, the brewery closure had wrought in the underlying cave.

The microclimate of Stahlmann's Cellars had changed dramatically during the seven-year interval since our first visit. In the absence of brewery waste, the cave life

died off. No rats or cockroaches were seen this time, and the living sewer jelly was gone too. By the same token, however, Stahlmann's Cellars has potentially become favorable habitat for other forms of cave life. While I don't recall having seen bats in the cave before or after the brewery shutdown, the cave has now cooled sufficiently to serve as a bat hibernaculum - enough for bats to get their body temperature low enough to enter hibernation, in a place where they are free from rodent predation.

As of this writing, parts of the former Schmidt Brewery are being converted into the Schmidt Artist Lofts.⁴¹ Hopefully the historic cave found in the depths below can also partake in the redevelopment, commemorating the heritage of the great nineteenth-century German brewers of St. Paul and their endless, fascinating mazes.

Acknowledgements

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28. A model for the conversion of historic lagering cellars into tourist attractions is provided by the Aktien Katakomben in Bayreuth, Germany, described at www.bayreuther-bier.de/katakomben.

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required going to a depth of thirty feet in order to secure safe support for the weight above'. According to the building permit (No. 38813, 12 August 1901), the foundation was to be laid on 'sand rock' (the St. Peter Sandstone), which could be interpreted as the cave floor. It may be, however, that the brick piers date to Walter Magee's massive upgrading of the facility in the years after Prohibition.

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