

PHILADELPHIA REGISTER OF  
HISTORIC PLACES

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DATE ENTERED

9 December 1998

TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1. NAME

HISTORIC

Historic Street Paving Thematic District

AND/OR COMMON

2. LOCATION

STREET AND NUMBER

Various, See inventory

3. CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
<input checked="" type="checkbox"/> DISTRICT	<input type="checkbox"/> PUBLIC	<input type="checkbox"/> OCCUPIED	<input type="checkbox"/> AGRICULTURE	<input type="checkbox"/> MUSEUM
<input type="checkbox"/> BUILDING(S)	<input type="checkbox"/> PRIVATE	<input type="checkbox"/> UNOCCUPIED	<input type="checkbox"/> COMMERCIAL	<input type="checkbox"/> PARK
<input type="checkbox"/> STRUCTURE	<input checked="" type="checkbox"/> BOTH	<input type="checkbox"/> WORK IN PROGRESS	<input type="checkbox"/> EDUCATIONAL	<input type="checkbox"/> PRIVATE RESIDENCE
<input type="checkbox"/> SITE		<input type="checkbox"/> ACCESSIBLE	<input type="checkbox"/> ENTERTAINMENT	<input type="checkbox"/> RELIGIOUS
<input type="checkbox"/> OBJECT	<input type="checkbox"/> PUBLIC ACQUISITION	<input type="checkbox"/> YES: RESTRICTED	<input type="checkbox"/> GOVERNMENT	<input type="checkbox"/> SCIENTIFIC
	<input type="checkbox"/> IN PROCESS	<input checked="" type="checkbox"/> YES: UNRESTRICTED	<input type="checkbox"/> INDUSTRIAL	<input checked="" type="checkbox"/> TRANSPORTATION
	<input type="checkbox"/> BEING CONSIDERED	<input type="checkbox"/> NO	<input type="checkbox"/> MILITARY	<input type="checkbox"/> OTHER:

4. OWNER OF PROPERTY

NAME

City of Philadelphia, Various

STREET AND NUMBER

CITY, TOWN

STATE

ZIPCODE

5. GEOGRAPHICAL DATA

VERBAL BOUNDARY DESCRIPTION

Thematic nomination: Streets scattered throughout City.

6. REPRESENTATION IN EXISTING SURVEYS

TITLE

None

DATE

FEDERAL  STATE  LOCAL

DEPOSITORY FOR SURVEY RECORDS

CITY, TOWN

STATE

# 7. DESCRIPTION

CONDITION

- |  |                                       |
|--|---------------------------------------|
| <input type="checkbox"/> EXCELLENT       | <input type="checkbox"/> DETERIORATED |
| <input checked="" type="checkbox"/> GOOD | <input type="checkbox"/> RUINS        |
| <input type="checkbox"/> FAIR            | <input type="checkbox"/> UNEXPOSED    |

CHECK ONE

- |                                    |
|------------------------------------|
| <input type="checkbox"/> UNALTERED |
| <input type="checkbox"/> ALTERED   |

CHECK ONE

- |   |            |
|---|------------|
| <input checked="" type="checkbox"/> ORIGINAL SITE | DATE _____ |
| <input type="checkbox"/> MOVED                    |            |

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

Of the hundreds of miles of roads and streets in the City of Philadelphia, only a 328 blocks on 159 different streets retain historic paving materials. The most common material remaining on these historic streets, granite block, comprises sixty-eight percent (68%) of all those surveyed. The granite block used varies greatly in color, shape and size from street to street. Nine streets have the paving known as "Belgian Blues". These granite blocks with blue glazing look like glazed brick rather than stone owing to their more uniform rectangular shape.

The second most common paving material, brick, also varies in color. Red brick appears the most, accounting for twenty-five percent (25%) of the total number of blocks. Yellow and orange brick only cover eleven blocks throughout the city. Engineers and pavers experimented frequently with other materials, producing streets paved with bluestone and wood block; only one example of each survives. Little of the most common street paving material of the eighteenth century, cobblestone, has survived, as only seven cobblestone streets remain and several of these are reconstructions.

Overall, these historic streets appear in good condition. Almost half, one hundred and sixty-one (161) have moderate integrity with some patching or noticeable repairs. Another one hundred and forty-six (146) have high integrity, meaning they remain completely or nearly intact.

# 8. SIGNIFICANCE

**PERIOD**

- PREHISTORIC
- 1601-1700
- 1701-1800
- 1801-1850
- 1851-1900
- 1901-1950
- 1951-
- ARCHELOGY-PREHISTORIC
- ARCHELOGY-HISTORIC
- AGRICULTURE
- ARCHITECTURE
- ART
- COMMERCE
- COMMUNICATIONS

**AREAS OF SIGNIFICANCE - CHECK AND JUSTIFY BELOW**

- COMMUNITY PLANNING
- CONSERVATION
- ECONOMICS
- EDUCATION
- ENGINEERING
- EXPLORATION/SETTLEMENT
- INDUSTRY
- INVENTION
- LANDSCAPE
- ARCHITECTURE
- LAW
- LITERATURE
- MILITARY
- MUSIC
- PHILOSOPHY
- POLITICS/GOVERNMENT
- RELIGION
- SCIENCE
- SCULPTURE
- SOCIAL/HUMANITARIAN
- THEATER
- TRANSPORTATION
- OTHER (Specify) \_\_\_\_\_

SPECIFIC DATES **Various**

BUILDER/ARCHITECT **Various**

**STATEMENT OF SIGNIFICANCE**

The examples of street paving included in this multiple resource nomination, possess significance as rare surviving fragments of the history of street paving in the City of Philadelphia, and as landmarks forming a visual record of the way Philadelphia looked in the past. Paving has had continual importance in helping to facilitate transportation both by foot and vehicle, and has played an important role in the health of the city by easing the maintenance of the roadway, thereby providing a cleaner environment. Because of the high costs of street improvements, historians have associated the evolution of urban paving with the development of the municipal government. Further, paving has played an important role in creating access between areas of the city and so relates closely to the residential and commercial development of the city. Finally, the development of different paving types forms a small chapter in the history of technology and engineering.

The history of street paving in Philadelphia begins in the early part of the 18th century. In 1701, a medieval style municipal corporation governed the city. The city's government under Penn's Charter "resembled in its outlines the typical constitution of an English town, such as prevailed from the close of the middle ages to the Municipal Reform Act of 1835." (Edward P. Allison and Bois Penrose, Philadelphia 1681-1887 A History of Municipal Development, Phila: Allen, Lane & Scott, 1887, p. 8) While officials of this corporation recognized the advantages of having paved streets early on, their revenues depended solely on the collection of "various fees for doing business and fines for violating ordinances." (Russel F. Weigley, Philadelphia: A 300 Year History, New York: Norton, 1982, p. 257) When the corporation set up an inferior court in 1704 to try and enforce collection of these limited revenues, the provincial government

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**9. MAJOR BIBLIOGRAPHICAL REFERENCES**

See attached.

**10. FORM PREPARED BY**

NAME/TITLE

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ORGANIZATION

Philadelphia Historical Commission

DATE

September 1998

STREET AND NUMBER

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CITY OR TOWN

Philadelphia

STATE

PA

## Section 8: Significance, continued

stopped the process under popular pressure from Philadelphians. Since this government lacked power, the street paving that did occur during this period resulted from the private and voluntary efforts of individual lot owners.

Similar repeated and futile attempts on the part of the weak municipal government to carry out improvements of street and footpaths marked the remainder of the first half of the 18th century. In 1712, the corporation passed a law following the medieval custom of requiring each inhabitant to work on the roads for several days each year and at the same time would accept a money payment in lieu of this labor. The government could not adequately enforce either of these provisions. Nevertheless, by 1719 observers found that "several of the inhabitants have voluntarily paved from the kennel [gutter] to the middle of the street with pebbles, and others are leveling and following their example." (Watson's Annals of Philadelphia, Phila.: Leary, Stuart & Co., 1877, vol. I, p. 213)

In 1727, the corporation ordered inhabitants to provide brick footways in front of their lots, and required the grading of roadways so that surface water "might drain into watercourses in the middle of them." (Weigley, p. 57) These little enforced provisions produced uneven results. The fact that Philadelphians used the streets as "convenient places on which to dump their garbage" exacerbated the problem of providing passable roadways. (Weigley, p. 57) Legal warnings and threats of penalty did little to dissuade householders from this "traditional mode of garbage disposal." (Weigley, p. 57)

In 1750, the Grand Jury once again noted "the extreme dirtiness and miry state of the streets." (Watson's Annals, vol. I, p. 213) Benjamin Franklin concurred and introduced an unsuccessful bill to pave the streets in 1757, although, by mid-century, "most of the streets had brick or flagstone sidewalks, often bordered with posts that protected pedestrians from vehicular traffic. Some merchants now also took the initiative to have cobblestones or paving blocks laid in the streets in front of their places of business." (Weigley, p. 69) Such private efforts continued until the city corporation itself took on the responsibility in 1762, when it funded by a general tax and by lotteries.

In 1762 the Minutes of the Assembly of Pennsylvania stated that "the Board is specifically called to consider the bad state of the streets, and to represent that the surplus money from the rents of the public are inadequate for their repairs." (Watson's Annals, vol. I, p. 65) The governing body thereupon authorized a lottery that raised \$7,500. It was used to pave North Second Street from Market (originally High) Street to Vine Street, thus making Second Street the first *municipally* [?] paved street in the city.

In 1786, the first curb stone appeared in Water Street, from Market to Arch, originally Mulberry, Streets, replacing the former practice of using wooden posts to support the footpath. The early street paving consisted of cobblestone, sometimes called pebble-paving, which cities

had used since the Middle Ages. The largest stones topped the crowns of the graded streets. While most streets had water courses to the sides, pavers provided those that collected the most water with channels or gutters in the middle.

In the early years of the 19th century, street paving continued to be a hotly debated and divisive issue. By this time, most officials and citizens understood and advocated the necessity of paving the growing, populous eastern section of the city. A stronger local government with more effective powers of taxation and increased business activity combined to provide the necessary funds. Citizens in the western section of the city, however, "wished to be relieved of the heavy taxation they suffered for the benefit of the eastern section." (H.L. Collins, Philadelphia A Story of Progress, New York: Lewis Historical Publishing Co., 1941, vol. I, p. 174) They pointed to the increasingly heavy shipping on the Schuylkill River as a reason either to divert paving money westward, or to form an independent city west of Broad Street.

Despite this dissension, street paving continued apace so that by 1830 observers noted that "the streets are, for the most, handsomely paved with round stones, and kept remarkably clean. The footways are paved with brick, and defended from the approach of carriages by ranges of curbstone. Numerous smaller streets and alleys divide the different squares, and are paved in a like manner." (E.L. Cary and A. Hart, Philadelphia in 1830, Phila: James Kay, Jun and Co., 1830, p. 15) Due to this improved situation, Philadelphia's "aristocratic homes were no longer... filled with dust in summer nor splashed with mud during rainy seasons." (Collins, vol. I, p. 216)

The use of cobble stone paving with stone curbs persisted almost uniformly throughout the first three quarters of the 19th century. Pavers laid these stones directly on the earth, pressed down by traffic early on, and by steam rollers in later years. Over time, a series of modest improvements occurred to extend the life and usefulness of the paved roads. For example, to prevent wheel ruts, pavers underlaid certain cobblestone streets with cheap, rough, flat stone so that the pebbles could not sink. Pavers also undertook experiments in which they varied the size of the stones with the resulting effect of a comparatively smoother ride provided by smaller stones.

By 1884, Philadelphia had about 535 miles of paved streets, covering an area of over 9,700,000 square yards. At that time cobble stone made up ninety-three percent (93%) of the pavement. As early as 1870, however, the limitations of cobble with sand or gravel interstices had become apparent. Mayor Daniel Fox noted, "the primitive mode of paving with cobble stones should be at once abandoned. It creates unnecessary wear and tear to vehicles and damages the horses, saying nothing about the intolerable rumble, rattle and noise occasioned in their passing over them. There have been a number of experiments tried in regard to the paving in concrete, in wood and in granite block, and I apprehend that councils can by this time conclude upon some uniform mode which would combine utility and quiet with smoothness and cleanliness, and with a due regard for public economy." (Mayor's Annual Report, 1870, p. 19) While Mayor Fox's remarks did presage the complete abandonment of cobble as a paving material, civil engineers and city officials decided that the paving material of a street should

reflect the needs of travelers at that location, rather than consist of a uniform material.

Several factors inhibited the rapid improvement of Philadelphia's streets. First, the city held property owners responsible not only for providing paved footways and granite curbing, but also for the street paving on newly opened streets. These property owners often chose the cheapest method, cobblestone, but soon, as city officials noted, "the property holder comes forward and wants the streets repaved with improved material out of the general fund... We have been trying for years to improve the character of the pavements in Philadelphia, and the obstacle which has met us at every turn is the cry of 'no funds'." (W.W. Thayer, Proceedings of the Engineer's Club of Philadelphia, "Street Paving - Its Costs, Character and Construction", vol. IX, no. 2, April 1892, p. 15) Second, while the city passed ordinances requiring the many traction companies to maintain the pavement on the streets where they operated cars, work usually occurred only when it proved necessary for the operation of such cars, leaving the roads unsuited for use by private citizens. The city resorted to various schemes over time to force the traction companies to pave, including the placement of obstacles in front of trolley cars to prevent their operation. While these tactics met with some limited success, constant litigation against the traction companies did not end until the consolidation of the street railways into the Philadelphia Rapid Transit Company (PRT), which the city ordered to pay an annual fee of \$500,000 after 1900. While all of these factors delayed the improvement of Philadelphia's streets, by 1916, Philadelphia, which had cobble paving over 93% of its streets in 1884, had less than three-tenths of one percent (0.3%) cobble paving; the rest consisted of several varieties of improved materials. (Good Roads Magazine, 6 May 1916, p. 197) In fact, by 1905 Good Roads Magazine called Philadelphia "the best paved city in the Union, with proportionately a greater percentage of improved pavements than any other city, and twenty-one percent (21%) more than greater New York. (Good Roads Magazine, February 1905, p. 145)

In the 1880s, the new industrial chemistry "thoroughly explained the composition of the material [concrete], and cheap, manufactured concrete of predictable quality became available." (Clay McShane, Journal of Urban History, "Transforming the Use of Urban Space: A Look at the Revolution in Street Pavements, 1880-1924", vol.5, no.3, May 1979, p. 281) This concrete replaced the traditional sand foundations, improving the quality of all varieties of surface pavement.

By 1891, lively discussion of the efficacy of the various paving materials had begun among city officials and civil engineers. "A process of trial and error led to the use of these materials before industrial chemists had reached a very precise understanding of their nature." (McShane, p. 282) Engineers recommended the following treatments for pavements in various locations:

Belgian Block: "Advances in stone quarrying cut the price of square granite blocks enormously after the Civil War, and these cheaper, smoother, easier to maintain blocks were replacing cobblestones in urban areas where heavy traffic demanded strong pavements." (McShane, p. 280) Engineers called this material "suitable for the constant wear and tear of the heaviest kind of travel, the pounding of large omnibus lines, loaded drays and three-horse carts, together with the

constant rumble of light carts, wagons, and conveyances of every description." (Thayer p. 3) The Highway Department ascertained that the ideal Belgian Block should be 3-1/2 inches wide, 8 inches long, and 6 inches deep, without bunches or depressions, with parallel faces at right angles to each other. Over the years, the City recognized the desirability of having uniform smooth granite blocks and on heavily traveled roads, "redressed" blocks of varying size, and then set them on a foundation of concrete under a "cushion course" of sand, and then grouted them with a mixture of Portland cement and sand. This provided a surface, called "for heavy traffic the cheapest and most enduring pavement of the times," and a surface that city officials later described as "smooth riding for automobiles and [that] afford[s] a good foothold for horses drawing heavy loads." (Mayor's Annual Report, 1892, p. 49)

Vitrified Brick: "In the late 19th century, brick manufacturers discovered, without completely understanding the process, that heating bricks to the point of vitrification hardened them enough to bear vehicles." (McShane, p. 282) The city laid the first vitrified brick pavement in Philadelphia in 1887. (Mayor's Annual Report, 1892, vol. III, p. 48) Brick paving was used largely on lightly traveled roads in suburban districts, as well as on numerous secondary downtown streets. Vitrified brick provided a smooth, quiet roadway, that the Highway Department could easily clean and repair. The major difficulty included in the use of this material stemmed from the varying "vitrification" or degrees of firing that occurred within each batch of bricks in a kiln. While at least twenty percent (20%) of each batch of bricks became unfit for paving purposes after firing, the city had the responsibility to inspect each brick and reject the brittle ones that brick merchants would try to include in the lot. The good bricks had the added advantage of selling inexpensively, costing about one-fifth (1/5) less than either granite block or sheet asphalt paving. Pavers set the bricks on layers of sand with Portland cement grouting in the joints. Vitrified brick pavement experienced a boom in popularity in the two decades after its initial use. By 1910, however, many of the older examples where the city used brittle bricks had begun to crumble, and the Highway Department largely discontinued the use of brick paving in favor of sheet asphaltum after 1910.

Wood Block: The City used wood block paving in locations that had heavy traffic where citizens desired a quiet roadway. While an unsuccessful experiment occurred with the material in Philadelphia in the 1830s, the first successful modern Philadelphia example dates to 1910. After the completion of the construction on the Market Street Subway, the City prepared to repave the busy street with its former Belgian Block paving. A group of businessmen considered the former granite block too noisy in heavy traffic. "The Market Street Business Men's Association was so insistent in the matter that it was considered expedient to accede to their wishes," and so wood blocks on sand over a cement base were installed instead. (Report of the Department of Public Works, 1909, p. 31) The paving "met with universal commendation, as it presents a smooth, practically noiseless surface, which is easily cleaned." (Public Works, 1909, p. 31) By 1913 the city found that "in many instances in the older sections of the city, the public schools fronted on streets paved with rough, old, Belgian Block pavements, which resulted in considerable noise caused by passing vehicles." (Report of the Department of Public Works, 1913, p. 100) The City quickly adopted a policy to provide a quieter environment in these locations and repaved the streets around schools and many hospitals with wood blocks during the following year. Those

concerned "were unanimous in their praise of the improvements from the standpoint of the comfort of the patients in the hospitals, and increased efficiency in school work due to the elimination of noise from the street." (Public Works, 1913, p. 100)

The popularity of wood block paving was explosive and short-lived. By 1919, the material had increased sharply in price, had begun to rot and exude horse urine and creosote, and so was no longer used by the Department of Highways. In all, a total of just under 20 miles of wood block paving existed in 1919, before the process of its removal began.

Gravel: In 1880, gravel paving accounted for just over half of the paved streets in American cities, laid in a process developed around 1820. (McShane, p. 279) Gravel surfacing existed in outlying districts, often used to pave the long roadways that led into Philadelphia's business district. Many of the suburban and rural districts could not afford the constant attention necessary to keep these roads in good repair, and this contributed to the move to consolidate Philadelphia city and county in 1854. Downtown businessmen urged the city to improve pavements on these roads, to strengthen the centralized pattern of business in Philadelphia. By the late 19th century civil engineers noted that "roads of gravel are suitable only for park purposes, and not municipal travel. Its advantages are smooth, hard, impermeable and less tractive surface at a low cost, capable of standing the ordinary light travel of carriages under the proper care of watering and general maintenance." (Public Works, vol. III, 1892, p. 49) While maintenance of many gravel roadways continued, the City constructed no new examples in the 20th century, and found these roads unable to withstand the suction of automobile tires.

Sheet Asphaltum: City officials called asphalt pavement "the pavement that comes nearest to the ideal pavement for a large city for either light or heavy traffic." (Public Works, vol. III, 1892, p. 49) Its advantages included the provision of a "noiseless, self-draining, impermeable, free-from-vapor roadway, with a great reduction of the force of traction on account of its smooth surface." (Thayer, p. 5) Experimentation with asphalt in Philadelphia began around 1875. Initially, engineers considered the use of this pavement somewhat disadvantageous because of its characteristic softening by heat, its slipperiness, especially for horses, and because it absorbed so much heat that it had a deleterious effect on horse hooves. Further, asphalt paving lacks the joints of block pavements, in which horses caught the protruding caulks which attached to their hooves, helping them gain traction. Eventually civil engineers mitigated these problems for the most part by using Trinidad rather than American asphaltum from California. The introduction of automobiles changed the requirements of paving, and made asphalt more practical. Asphalt pavement, while less durable than block paving, also has the advantage of being replaced quickly with minimal labor.

In the 1890s recommendations from the Department of Health encouraged the use of asphalt paving. In 1891 the Department "passed a resolution calling the attention of the Department of Public Works to the bad sanitary condition of many of the small streets and alleys in a section of the city where disease was likely to become epidemic. [The Department of Public Works] requested an appropriation be made to pave all these small streets with sheet asphaltum, in order that they be properly drained and kept in a cleanly condition... There is nothing so

important to the health of the city as the keeping of this class of streets in proper sanitary condition." (Public Works, 1892, p. xvii)

After 1900, the work of chemists like Dow and Richardson meant that any asphalt-based oil could be refined to serve as the binder in an asphalt pavement. This reduced costs enormously, especially since unscrupulous monopolists controlled the Trinidad asphalt deposits, the most accessible natural source of high quality. By 1920 the use of asphalt paving had become so widespread in Philadelphia that the City Council appropriated \$175,000 for the construction of a municipal asphalt plant, following the recommendation of the highway department. While the city recognized that the early asphalt roads laid without concrete foundations would continue to cause problems, Philadelphia would benefit from the plant because of the availability of cheaper material under its own jurisdiction.

The new paving materials reorganized traditional patterns of urban life because of the "enormous changes in the perception and use of urban street space." (McShane, p. 283) In the late 19th century streets served as open space for families, neighbors, and pushcart vendors. Therefore, while the typical form of urban housing in Philadelphia was the rowhouse, residents were not without open communal space. By 1900, however, modern paving materials had made it possible for an increasing number of vehicles to travel at greater speeds, making streets primarily arteries for transportation. To offset this new set of spatial circumstances, architects and builders provided many of the houses built in the new streetcar suburbs in this period with semi-public exterior space including front porches and yards. The various types of street paving in front of these residences, as well as that around the downtown, can be associated with the different circumstances that existed in the city at specific times. Today, these streets place buildings within a context, and evoke a sense of time and place in the various locales.

As the 20th century progressed and the automobile dominated, the highway department adopted the advice of 19th century mayor Daniel Fox, and decided that the improved asphalt paving best served the needs of all residents in all areas of the city. Asphalt laid on top of the older paving materials has come to dominate the streets of Philadelphia. Today, the remaining eclectic examples of street paving including vitrified brick, wood block and granite block survive as multiple historic resources recalling visually the technological and spatial development of Philadelphia.

## Section 9: Major Bibliographical References

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