# Asphalt Modernism on the Streets of Toronto, 1890–1900

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*Résumé*

*Dans les années 1890, les ingénieurs municipaux de Toronto ont été engagés dans un élan de modernisation qui menait à l'adoption à grande échelle du pavage en asphalte. Leur recommandation d'utiliser l'asphalte, dans la situation particulière de la circulation à Toronto, témoigne de leur adhésion à la croyance que ce revêtement contribuerait à l'esthétique et l'hygiène de l'espace physique et humain de la ville, malgré ses effets dévastateurs sur certaines rues. L'asphalte a favorisé l'apparition de cyclistes à la mode dans les rues d'une ville secouée par l'impact de l'industrialisation. Bref, l'asphalte symbolisait le modernisme dans les rues.*

« Comme on juge l'homme à son habit
on juge une ville à ses rues. »
*Charles Mulford Robinson, 1899*[1]

*Abstract*

*In the 1890s, Toronto's city engineers participated in a modernizing impulse that included the widespread use of asphalt pavement. The engineers' recommendation of asphalt for Toronto's particular traffic circumstance demonstrates an ideological commitment to the belief that asphalt promoted aesthetics and hygiene in the physical and human space of the city, in spite of the pavement's ruinous effects on certain streets. Asphalt facilitated the appearance in the streets of fashionable cyclists, in a city suffering the deleterious effects of industrialism. In short, asphalt symbolized modernism in the streets.*

"As a man is judged by his linen, a city is judged by its streets."
*Charles Mulford Robinson, 1899*[1]

Cultural geographers have altered their thinking about culture. Early and mid-twentieth-century geographers regarded culture as a "superorganic" entity, "much greater than the simple sum of its parts"; culture existed "by some remarkable process…quite apart from the single person or his volition, as a sort of 'macro-idea,' a shared abstraction with a special mode of existence, and set of rules."[2] Revising this oddly metaphysical yet ironically reifying notion of culture, later geographers now see culture as manifestly political, positing a human-made material world deriving from and susceptible to ideology.[3] Peoples and their "geographic imaginations," with all the social constructedness, ideational variation and contestation that the term implies, produce cultural space. They engage in "culture wars" in part over "how meaning is made manifest in the very stones, bricks, wood, and asphalt" of the spaces they inhabit.[4]

Before this "cultural turn" in geography, cultural geographers investigated materiality scientifically, using a specifically Linnean method of allowing "the thing in itself to describe itself"; the material artifact alone yielded "Truth" about the culture that produced it.[5] Now, the cultural geographic examination of materiality reaches beyond the superficiality of form in search of the polity and ideology of cultural production — including gender, race and class — that superficies alone cannot reveal.

This study of the use of asphalt pavement in Toronto adopts the current method of cultural geographers to explain the urban geography — the landscape — of a nineteenth-century Canadian city under the spell of modern cultural ideology. It explains why asphalt beguiled late-Victorian Torontonians embracing modernism's ability to mitigate the infrastructural difficulties of urbanization. Facilitating transportation and mass mobility

through science, asphalt also promoted hygiene, aesthetics and order. By 1900, good pavements had become an indispensable element of city beautification. Charles Mulford Robinson, a chief proponent of the urban beauty impulse, called good paving "the *sine qua non*" of city beautification, insisting that it was "foolishness…to talk of statues and fountains and lovely vistas if the streets be poorly paved."[6] Beauty in urban landscapes began with "properly" paved streets, preferably asphalt and bituminous pavements, which increased steadily as road surfaces in the modern city from about the 1860s.[7] Modern industrial cities paved with asphalt displayed a cosmopolitanism, sophistication and aestheticism that cities with lesser pavements — those made of gravel, macadam, wood or brick — eschewed.

Asphalt pavement far surpassed in quality the most widely used street surfaces: gravel, cedar block and water-bound macadam — successive smaller and larger layers (smaller on the surface) — of rolled, broken limestone. Metal-rimmed cartwheels and shoed horses moving along macadam pavement crushed the smaller stones to a fine dust, which settled in the interstices of the stone layers. Rain then turned the dust to mud, making a natural cement (pneumatic tires upset the principle by sucking the dust from the cracks); hence "water-bound" macadam).[8] Though durable when dry, macadam pavement was noisy, hard on carts and animals, and became a smelly slough in the wet times of the year and a dust bowl in the dry. Cedar-block pavement, on the other hand, consisted of six-inch cedar logs stood on end on a bed of sand, gravel and, very infrequently, concrete. Traffic-friendly, noiseless and cheap, cedar logs unfortunately had a very short, pulpy life span and were notoriously slippery when wet. In contrast, asphalt was noiseless, dustless and durable in the right conditions. Little wonder those who lived with the mud, dust, dirt and "filth" — manure — generated or trapped by macadam, cedar-block, and gravel roads believed asphalt bested mere technical practicality with functionalism, hygiene and beauty.

By examining asphalt use as it relates to aesthetics in Toronto at the end of the nineteenth century, we may question whether or not asphalt provided the best possible pavement for an early modern city. City engineers, seduced by the beauty and modernism of asphalt, widely recommended its use in Toronto, despite asphalt's lack of cost-effectiveness and its inferiority as a durable surface, given Toronto's traffic conditions. Asphalt pavement, well suited to rubber-wheeled vehicles, made a poor choice for the conduct of both the massive, weighty streetcars that became a permanent urban attribute by the 1890s and the heavy cart and animal traffic persisting in modern cities until the 1940s (Fig. 1). Indeed, use of asphalt in Toronto

***Fig. 1***
*Animal traffic in Toronto: note the condition of the brick pavement (Permission Mike Filey;* Toronto: Reflections on the Past *(Toronto: Nelson, Foster and Scott, 1972), 74)*

on the streetcar track allowances contravened standard road engineering practices of the day, as we will see below. By accepting asphalt as the alternative to cheap but problematic cedar block pavement, Toronto's city engineers were part of a milieu that promoted street cleanliness, beauty and modernism, including the promotion of the bicycle and cycling, at the expense of economic efficiency and so-called common sense; however, there were practical alternatives.[9] Modernism aestheticized technology, such as the bicycle, within a culture seeking not only to compress time and space but also to moralize the effects of technology in cities.[10] Put plainly, asphalt would entice beautiful and moral people into the streets.

In a substantial way, then, this discussion of asphalt modernism identifies the efficacy of social influence — specifically ideology — on the material world, though "cultural geography" strives to evince the reciprocal nature of the everyday commerce between geography and cultural expression. Given this, it only makes sense that cultural geography would document the ideological interests of Toronto's city engineers as they affected the urban geography of Toronto.

## The Aesthetics of Asphalt Pavement

Robinson, like many city beautifiers at the end of the century, believed that "[g]ood pavements" promoted "the essentials of municipal dignity," which for many was the combination of beauty and hygiene.[11] An exemplar of Victorian environmental determinism, the determinate effect of environment on social behaviour, Robinson regarded asphalt as a powerful social geographic solution to the Dickensian squalor of the tenement environment. As he put it, "with the more urgent desire for urban regeneration [comes] the recognition of asphalt's philanthropic and hygienic value in the poorer districts."[12] New York City officials agreed with this assessment of asphalt's civility, dignity, beauty and hygiene: the city laid thousands of yards of asphalt in the Lower East Side during the 1890s in an attempt to enhance the quality of life of tenement dwellers.[13] The cleanliness and beauty of asphalt apparently made a safe, comely and clean playground for tenement children, who scrabbled in the unpaved streets or rubble-strewn lots made famous in photographs by Jacob Riis.[14]

The laying of pavement to advance municipal dignity, however, proved a formidable task for most North American cities languishing on inadequate street surfaces. Peter Baldwin reports that "[a]s late as 1923 small cities often had many more miles of dirt streets than of pavement, and a number of larger cities admitted that most of their pavement was water-bound macadam."[15] Roger Riendeau has shown that Toronto's current and capital expenditures on roadways in 1930 totalled $10,712,000, which was an increase of a factor of ten from its 1900 expenditures ($1,028,000), suggesting that there was much work to be done on the surfaces of Toronto's thoroughfares in the early twentieth century.[16] Unpaved roads hampered the free movement of traffic, goods and, especially, people, the mobility of the latter a social imperative of North America's culture of urban individualism.[17] Unpaved roads made the modern city seem anything but modern and, more importantly, anything but beautiful.

Roads covered with pavements other than asphalt encouraged a kind of anti-modern thinking and anti-urban behaviour, symbolized by the use of animal-powered vehicles, that modernist reformers despised. The horse was still an important attribute of late-Victorian cities, as was horse manure. Horses produced "street apples," urinated prodigiously and were the source of a pervasive odour, which, although foreign to contemporary Western cities, defined Victorian urbanism and its animal culture.[18] Urban historian Clay McShane documents the turmoil of late-Victorian streets under the pressures of animal traffic and the respite the bicycle offered.[19] For one thing, bicycles did not bite or kick passers-by, nor did they cover the streets with millions of tons of manure, which was filthy, foul-smelling and caused respiratory infection. Neither did bicycles drop dead every hundred or so miles travelled; by the 1880s, New York removed 15 000 carcasses a year, or approximately forty-one a day, from the streets. In Great Britain, street sweepings were given to farmers for fertilizer.[20] For Victorian espousers of the modern, we can imagine such circumstances were untenable. The presence of horses and horse manure in the city urged hygiene- and beauty-conscious Victorians, who "s[aw] the city in its turds," to pursue the modernization of pavement, if only because asphalt was much easier to clean than stone or wood.[21]

Accordingly, urban reformers widely accepted the idea that "good pavements [we]re necessary to the highest development of the commercial, sanitary, and esthetic life of the city."[22] "Good roads in Canada," one writer argued, meant "a higher standard of citizenship, [and] a people pervaded by education and good morals."[23] Schoolchildren in Toronto learned that "roads and highways [were] an index to the nation's civilization."[24] Indeed, in a list of eight economic benefits of asphalt pavement, road engineer Ira Baker attributed five to

***Fig. 2***
*A properly paved environment (Permission Mike Filey)*

aesthetics and hygiene.[25] "An absolute necessity to both the business and resident districts of… cities…good pavements add[ed] greatly to the health, comfort, and pleasure of life."[26] With so many social benefits, little wonder reformers pushed for pavement.

Pavement had economic rewards and contributed to the prosperity of a city.[27] In 1900, *Municipal Engineering* reported that "cities with disagreeable, repelling, improperly paved, noisy, poorly cleaned streets cannot become nor remain successful cities. They cause men who are successful financially to go to more attractive places."[28] Canadian engineer and analyst R. O. Wynn Roberts wrote that "[w]ell-paved and clean streets…because they are seen by all…constitute a measure of successful administration, foresight, and judicious expenditure of ratepayers' money. The converse is equally true, for unsightly, dirty streets are powerful factors in the demoralization of the people."[29] Roberts's moralization regarding pavement fits with Daniel Burnham's and Edward Bennett's insistence, in their *Plan of Chicago* (1909), that even Chicago's infrastructure conforms with "the dictates of good taste" (Fig. 2).[30] Smooth, hygienic, noiseless and preferably asphalt pavement perfectly suited the late-Victorian enthusiasm for city aesthetics.[31] It seems, then, that an "ideology of the aesthetic," posing as "fact," determined the normative relationship between pavement and people, including opinion on which type of pavement was acceptable.[32]

## Toronto's Bad Roads

Toronto struggled with poor street surfaces. Effective pavement, of which asphalt is only one type, simply cost too much money. Ratepayers refused to grant City Council permission to lay pavement under Local Improvements schemes, where local residents paid the construction costs. Despite ratepayer adversity, city engineers continued to recommend pavement, particularly asphalt; they knew intimately the deteriorating condition of Toronto's streets and believed profoundly in the merits of asphalt, as shown below.

Toronto had hundreds of miles of streets, most surfaced with gravel, macadam or cedar blocks. Such roads tormented the engineers and reformers, cedar blocks occupying much of street surfacing in the city. When cedar-block roads were excluded from the equation, "only 10½ per cent. [*sic*] of the roadways inside the City limits…ha[d] anything like a durable covering."[33] No one liked macadam or cedar-block roads, nor, especially, cedar's poor wear, even if it came cheap. "This wear," Assistant Engineer H. D. Ellis wrote of cedar-block roads,

"occurs exactly in the centre of the tracks and is caused entirely by the sharp caulks in the horses' shoes during the spring, autumn and winter…A hollow once formed at this point acts as a gutter for rain water, and the blocks, thus kept wet and soggy, soon cut to pieces under the wear from the horse's feet."[34] In less than five years, and often sooner, a cedar-block road turned to pulp, pounded by the iron shoes of heavy horses and metal rims of cartwheels.

Even worse for a society embracing economic and scientific efficiency, as the City Engineer reported with a hint of perturbation, cedar blocks were not cost-effective:

> *If the public could be brought to understand that poor roadways mean a heavy annual tax for repairs and cleaning, and, indirectly, by the additional cost of haulage, the destruction of vehicles and harness used, and injury to horses, they would not hesitate about repaving these thoroughfares with some proper material. The average strength required to be exerted by a horse to pull one ton on smooth pavement is given as between 16 lbs. to 20 lbs. per ton, whereas on a broken stone roadway in good condition it amounts to 60 lbs. On a cedar block road in bad condition it probably amounts to 100 to 150 lbs. per ton, that is, it requires more from 4 to 5 horses to do the work that should be done by one.*[35]

Remember both this cost-benefit assessment of cedar blocks and the recommendation of repaving with a "proper material." The argument of this essay hinges entirely upon Toronto's city engineers' interpretation of "proper."

Cedar-block pavement posed another problem. Street cleaning on block streets was "very much handicapped…by reason of their defective condition, it being simply impossible to clean them thoroughly, with the numerous holes and cavities in the blocks making it a lodgement for the dirt. The expense of the work is also materially increased from this cause."[36] The city maintained a $55,000 annual budget for street cleaning, street watering and snow removal. Cedar-block roads — sixty-four miles of which were laid between 1890 and 1900, according to Table 1 — were the main expense.

Such roads also manufactured dust exceptionally. Made up of round blocks abutting each other, cedar-block roads trapped dirt and manure (Fig. 3). Macadam, on the other hand, used water-bound dirt to hold it together, and dirt became dust in hot weather. In Toronto, winds off Lake Ontario and the passing of streetcars stirred the dust into clouds. Consequently, city engineers employed different methods to keep dust down, "including emulsions of paraffin, solutions of calcium chloride and various oils," although it became "evident that tar was the only practical solution."[37] Crews also watered the streets, usually soaking them once per day. This watering was generally ineffective, and dust continued to choke commercial and pedestrian life in Toronto.

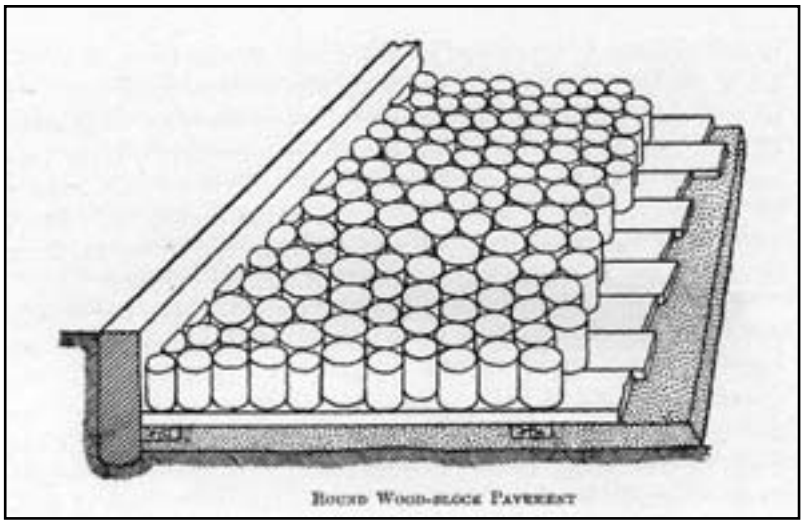


***Fig. 3***
*Cross-section of cedar block pavement construction: blocks on planks on gravel, ca 1900 (Ira Osborn Baker,* A Treatise on Roads and Pavements *(2nd ed., New York: John Wiley & Sons, 1913), 554)*

Toronto's Retail Merchants' Association agitated for "properly watered" streets to protect their goods and make it possible for consumers to shop comfortably.[38] Omnipresent dust in the downtown area ruined merchants' displayed goods, outside and in, and aggravated their customers. In the spring of 1898, Toronto Alderman Bowman recommended "sprinkl[ing] the [streets] throughout the day rather than…flooding" them once.[39] By midsummer that same year, the lack of action following Bowman's recommendation impelled the *Daily Mail and Empire*'s "flaneur" columnist to suggest that the city's policy of watering the street once a day assuaged nothing but aldermanic neglect. "The summer is passing and the dust is increasing… Alderman Bowman, push that proposal of yours. Never mind the old ladies in the Council; sprinkle them too if you like."[40] Unfortunately, Council procrastination comprised only part of the problem.

The inability to suppress dust linked to sheer physics on dreadful roads: "The great majority of block paved streets are so bad that we dare not run a watering cart on them," Board of Works Commissioner Jones said at a Council meeting in February of 1898; "they would break the carts." In Toronto, there were over a hundred miles of such roads that never got a drop of water in the summer.[41] And it was more than the road surface that needed repair. Months previous, Engineer Keating

backed Mayor Shaw's "effort[s] to enlist the support of the Council in his brick sidewalk and devil strip [so called because one had a "devil of a time" if caught between opposite running streetcars] scheme," the latter including the paved track allowance, often supported with brick or granite setts, in which the streetcar tracks ran.[42] The weight of streetcar and cart traffic produced "frightful ruts." As a result, "[a]ccidents [we]re happening daily…and one need only ride from Yonge street to Spadina avenue on College street to see."[43] Such was the state of Toronto's pavement in 1898: "probably 40 or 50 miles of streets in the city… completely worn out."[44]

The unpaved and/or badly paved source of dust in dry weather was a mire in wet weather. A ubiquitous and malodorous mud sucked the boots from pedestrians in the wet seasons, especially early spring, dubbed by one Torontonian as "the mud period."[45] Mud was the lot of modern cities. Charles Baudelaire, the modernist city-poet of Paris, described the defilement of ideals in *la fange du macadam* in mid-century Paris.[46] Another, less poetic, writer implies this same loss of sanctity in the disrespectful ooze of Toronto's thoroughfares.

> *It must be evident to the most unscientific observer that this is the mud period. Mud soils the bottines of beauty, draws a frown on the matronly brow of Beauty's mother, bemires the merchant and manufacturer; makes politicians look dirtier and damages the poor man's only pair of breeches. Nothing short of a vicious pen can express the disgust with which people generally, and perhaps women more particularly, view the…mud which the going away of the snow causes to accumulate in uncared for city streets…Thick, oozy, and sticky city mud has not even the fresh scent of country mud to redeem it from absolute nastiness…*[I]*t afflicts us with an amount of dirt on our persons, and in our houses, which is not by any means conducive to a happy frame of mind.*[47]

Marshall Berman notes that *la fange,* though literally translated as "mud," is also a figurative term for "mire, filth, vileness, corruption, degradation, all that is foul and loathsome," "the nadir of the moral universe."[48] Could boosters hawk cities where unsightly, dangerous and impassable streets fettered people, traffic and imaginations with nasty, manure-spiced *fange*?

If Torontonians loathed mud and dust, they also resigned themselves to it. The City Engineer's recommendations for pavement were frequently rejected by a Council acting on behalf of its constituents. Imagine the frustration of city engineers who knew that "[a] great many of the cedar block roadways are in deplorably dangerous condition, and although sixty-four new pavements have been recommended this year [1896], they have, with a few exceptions, been petitioned against by the ratepayers."[49] The ratepayers' ability to thwart reform raised the ire of more than the city engineers. "Considerably more than half of the pavement in the city is in the most pressing need of repair," Toronto's *Daily Mail and Empire* grumbled. "There are miles and miles where it is unsafe to take a vehicle; street after street can be instanced that would be a disgrace to a back country village; and yet little or nothing is being done to improve their condition." Yet, because of an inadequate Local Improvements plan, the writer argued, too many property owners were able to impede pavement upgrades in their neighbourhoods, thereby obstructing the public good.[50] Ratepayer dissent, through petitions such as the McCaul Street petition of April 1897, which specifically rejected a recommendation of asphalt, curtailed local improvements.[51]

## Which Surface?

The ratepayers' deflection of street improvements helps us conjure a vivid picture of the crudeness of Toronto's street surfaces, though not all Toronto's streets lay bruised and broken. Despite opposition, Toronto laid asphalt pavement. Engineer Ellis fairly gloated over the increased traffic and the percentage — 46 percent more — of tons hauled on Adelaide Avenue between Victoria and Toronto streets after paving them with asphalt. Ellis wrote that "[a]n average of 688 more vehicles made daily use of this thoroughfare, which must relieve congestion at the intersection of King and Yonge Streets. The continuation of this pavement from Yonge to York Streets, [*sic*] I consider a necessity, and should be recommended without delay."[52] Of course little of this traffic was motorized. Toronto would not see regular and regulated automobiles until the early 1900s, vehicle registration statistics beginning in 1903.[53] On the other hand, the Canadian Wheelman's Association (CWA) claimed in 1898 that 30 000 cyclists travelled the streets of Toronto.[54] Thus, while asphalt provided a handsome, consistent, noiseless surface for pneumatic tires, clumsy animal-powered carts and streetcars formed the bulk of the traffic.

Engineering "common sense" urged that pavement meet the requirements of the people and vehicles using it.[55] However, if the consideration of traffic needs truly interested Toronto's engineers, one specific surface should have attracted more than their scant attention: the wooden-block

pavement (Fig. 4). Wooden blocks were more like wooden bricks. They were rectangular, three-and-a-half to four inches wide, five to ten inches long, four inches deep. They laid snugly in a bed of Portland mortar on a concrete foundation, the joints between the blocks filled with either Portland or grout, or a bituminous filler.[56] The wooden block was infused under ten pounds of pressure with an oil derived from creosote oil, "possessing the original preservative properties with a longer endurance, and also having the effect of forming a varnish-like film or coating on the outer surface of the wood protecting it from the elements," if making it more slippery.[57] This substantially improved the wooden block's specifications over other treated blocks, which, upon contact with water, tended to form an emulsion that evaporated up to seventy-five percent of the preservative.[58] Non-treated blocks absorbed water and could expand up to fifty percent.[59]

Table 1 shows that in eleven years Toronto laid no wooden-block pavement.[60] This is surprising, since wooden-block pavement met the aesthetic criteria set out by Burnham and Bennett. Circa 1900, Engineer William Judson maintained that wooden-block pavement, "surpass[es] others in freedom from noise, and rank among the best in qualities and cost."[61] Wooden blocks, when treated with kreodone-creosote and laid to a snug fit on a bed of concrete, created a noiseless, neat, easy-to-clean and, importantly, easy-to-fix pavement, repairs amounting to a manageable one-and-a-half to three cents per square yard per annum.[62] Wooden block pavement also furnished the street with a concrete base, should city engineers choose to lay asphalt at a future date; asphalt-readiness became a precondition for recommending brick pavement, another popular choice among engineers.[63] Wooden blocks, however, were very slippery and this would pose a problem for cyclists, and the consideration of cyclists was an important point, as we will see below.

## Asphalt Bias

Laying asphalt in heavy traffic areas constituted negligence on the part of Toronto's city engineers. They recommended asphalt for most capital infrastructure upgrades in place of more durable pavements; wooden-block pavement or bitulithic on tarmacadam (tarred gravel on tar-bound macadam) would have done the same thing more efficiently and more cheaply. Further, Toronto's hinterland was rich with wood and stone; the city also had a brick works, its remnants still visible today. Toronto, however, did not have easy access to asphalt, a point crucial to this argument.

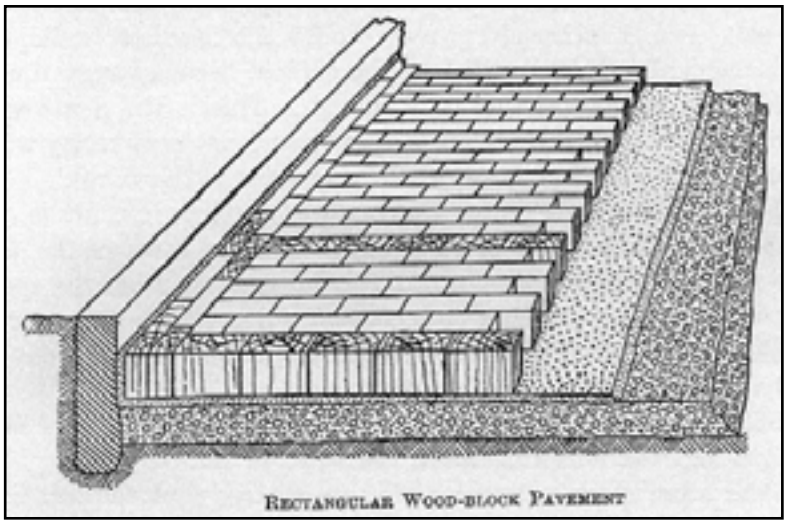


***Fig. 4***
*Cross-section of wooden-block pavement construction: block on concrete on gravel (Ira Osborn Baker,* A Treatise on Roads and Pavements *(2nd ed., New York: John Wiley & Sons, 1913), 557)*

An engineering "rule of thumb" stated that the choice and cost-effectiveness of a road surface depended on the availability of surfacing material to the city.[64] Did restricted access to asphalt stop the city engineers? No. Instead, they suggested that if the city were "to contract or to purchase a small [asphalt] repairing plant…a matter that should be settled without delay…roadways will not be allowed to deteriorate for want of attention."[65] We may read this as an admission of irresponsibility on behalf of Toronto's engineers, whose asphalt bias continued, despite the absence of an asphalt plant for repairs.

This asphalt bias vexed one critic knowledgeable about the practical mechanics and economics of flexible, or tar-based, roadways. After reading in Rust's report that track allowance repairs would cost $115,000, a writer with the cryptic moniker "W" called for an aldermanic inquiry into the "inexplicable preference for asphalt on the part of [Engineer] Rust and his roadway staff."[66] The track allowances, W commented incredulously,

> *were laid five years ago, at an enormous cost to the city…and under civic inspection* [and] *the contractors bound to keep them in repair for five years, and then leave them in a condition satisfactory to the city. Every summer these streets have been constantly in the contractor's hands for repairs, to the annoyance of storekeepers and residents thereon, and causing constant delay in traffic.*

As a result of this, W noted "two facts":

> *First, the inefficiency of civic inspection: and second, the total failure of asphalt as a pavement between the tracks. It has been tried with all kinds of "toothing" and without "toothing," as on King*

**Table 1**
**Mileage of Different Classes of Pavement Laid in Toronto…**
**from 1890 (miles)**

| Class of Work | 1890 | 1891 | 1892 | 1893 | 1894 | 1895 | 1896 | 1897 | 1898 | 1899 | 1900 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pavements and Roadways:** | | | | | | | | | | | |
| Asphalt | 1.73 | 1.635 | 6.216 | 5.607 | 3.067 | 1.156 | 0.366 | 0.460 | 3.408 | 6.215 | 6.348 |
| Bitulithic | | | | | | | | | | | |
| Cedar Block on Sand and Plank | 15.51 | 9.186 | 3.349 | 3.249 | 0.852 | 1.753 | 0.428 | 2.459 | 4.831 | 3.151 | 7.842 |
| Macadam | | 0.123 | 0.494 | | 0.059 | 1.663 | 1.661 | 0.510 | 2.089 | 5.013 | 2.503 |
| Tar Macadam | | | | | | | | | | | |
| Cobble | 0.10 | 0.069 | 0.366 | | | | | | | | 0.068 |
| Tamarac on Concrete | 0.192 | 0.77 | | | | | | | | | |
| Cedar Block on Concrete | | | 8.416 | 2.185 | 0.826 | 0.227 | 0.038 | | 0.084 | 0.079 | |
| Stone Set on Concrete | | | 0.705 | 3.743 | 2.536 | 0.085 | | | | | 0.107 |
| Scoria on Concrete | 0.138 | | 0.028 | | | 0.117 | | | 2.986 | 1.367 | 1.247 |
| Asphalt Block | | | | | | | | | | | |
| Brick on Concrete | | | | 3.964 | 0.787 | 0.744 | 1.032 | 5.803 | 6.079 | 3.670 | 5.472 |
| Brick on Gravel | | | | | | | 0.028 | 0.838 | 0.352 | 0.934 | 0.057 |
| Brick on Broken Stone | | | | | | | | | | 0.546 | 0.516 |
| Treated Wood Block | | | | | | | | | | | |
| Concrete | | | | | | 0.071 | | | 0.057 | | |
| Gravel | | | | | | | | 3.138 | 4.756 | 0.069 | 0.303 |
| Totals | 17.670 | 11.090 | 19.547 | 18.748 | 8.154 | 5.816 | 3.553 | 13.208 | 24.666 | 21.120 | 24.666 |

(CTA, *Annual Report of the City Engineer of Toronto for 1911* (Toronto: The Carswell Co., 1912), 167–168)

> *street, and in the face of these undoubted failures Mr. Rust still persists in recommending asphalt for repairing the very streets on which it has been such a signal failure.*

The "toothing" W mentions here refers to the stone or brick supports that buttressed the track rails. With or without, however, Toronto's paved track allowances did not meet accepted standards.

This was no exaggeration. In a letter to Alderman Saunders, CWA Chief Consul Howson offered, sarcastically, "[m]any thanks…on behalf of Toronto bicyclists re the atrocious condition of the track allowances." "Why the chief engineer does not proceed and keep these allowances in a proper state of repair in accordance with the [street railway] agreement" mystified Howson. Cyclists should, he argued, be able to "take a jaunt a-wheel and still feel free from danger of being killed by reason of the terrible condition of some parts of this city's thoroughfares," meaning, particularly, the streets with streetcar tracks.[67]

Another writer echoed Howson's opinion: "Toronto asphalt is in a bad plight and ought to be repaired. It is as much as the bicyclist's life is worth to navigate along the street car tracks just now, and the tracks in many city streets are the only portions of those streets that can be used."[68] Still another commentator barely escaped from a fatal situation:

> *Sir, Today as I was wheeling down Yonge street I turned to avoid a waggon* [sic]*, my wheel slipped on one of those holes, and I found myself sailing into the fender of a moving trolley. Fortunately for me, and the accident companies, and the careless city fathers, the car was stopped before any damage was done. How long are the wheelmen of this enlightened city going to tolerate this disgraceful state of asphalt between the tracks?*[69]

"Signal failure" aptly describes asphalt usage on Toronto's main streets. Curiously, Road Engineer Clifford Richardson includes in a list of the causes of "deterioration of or defects in asphalt pavements…1. Defects in construction due to… Inferiority in the asphalt or lack of intelligence in its use."[70] W would agree.

Why? Road engineers at the turn of the twentieth century had established an efficient method of buttressing streetcar tracks; the *fin de siècle* electrification of streetcars meant an ever-increasing weight burden on roadbeds.[71] Brooklyn City Engineer George Tillson describes with scientific precision the various acceptable methods for laying track and paving the allowances.[72] Brick, stone or treated wood blocks — granite setts though expensive were ideal — chamfered to fit the inside and outside grooves of the rail, laid on a base of concrete, and set in a bed of portland make up the bulk of his illustrations. The one pavement that, ironically, he reports "proved entirely satisfactory," is the one used by Toronto, which I will discuss below. Judson suggested that the most successful asphalt pavement with street railway tracks embedded "put some other material than asphalt next to the rails… granite blocks…stone blocks…vitrified brick."[73] Tillson gives an example of this, comparing Toronto with Sioux City, Iowa, the latter using chamfered bricks to abut the rail and a thick bed of concrete between, upon which a surface coat of asphalt was laid. When asphalt had been used to abut the track, "ninety pound rails with nine- or ten-inch webs welded in continuous lengths, and placed in twelve-inch concrete base insure[d] rigidity." However, as Tillson also shows, though Toronto poured a concrete foundation, track construction used lighter, webless seventy-three-pound rails and scoria blocks — made from slag — not granite blocks because, and this is important, "so much complaint was made by the bicyclists" about the latter (Fig. 5).[74] Asphalt was then laid against the rail, and hence the problem of deteriorating pavement along the streetcar tracks.

W further demanded the disclosure of the actual costs of laying asphalt, insisting Toronto paid too much, and claiming that the "existence of an asphalt combine was proved five years ago," and that it was even more potent today. "Asphalt can only be secured by firms outside the combine," W wrote, by "buying the material in ship loads on the plea of using it in some country in the eastern hemisphere, and the story of how a cargo for this Dominion was secured in England by a ruse was told in the press some time ago." As a result of the combine — monopoly — Toronto paid too much, though it did not have to. Asphalt purchased in England could have been laid in Toronto at a cost of between $18 and $19 per ton.[75]

What are we to make of W's allegations? James Hughes and Ellsworth Foster suggested that asphalt could be laid for between $15,000 and $20,000 per fifteen foot mile of road, while wooden-block and brick pavements cost approximately $20,000.[76] This alone would suggest that asphalt was cheaper, though Hughes and Foster wrote twenty years later. However, if W's claim is valid, Toronto paid on average $3.10 per square yard. Per fifteen foot mile, this means that Toronto was paying $27,280, an amount that differs substantially from Hughes's and Foster's estimate.[77] If we cannot trust W, a table in Judson's book "shows the conditions and costs [of pavements] in 1894 in…32 cities."[78] Judson's average cost of asphalt per square yard is $2.81, with outliers as low as $1.95 (Utica, New York) and as high as $3.50 (Buffalo, New York). A U.S. Department of Labor statistic averaging the cost of asphalt per square yard in 129 American cities arrived at the approximate figure of $2.75; note that the Canadian and U.S. dollar traded at par from 1879 to the outbreak of the First World War.[79] *Saturday Night* confirms this average cost, reporting that in Toronto, Jarvis Street residents petitioned for an asphalt pavement at a price of

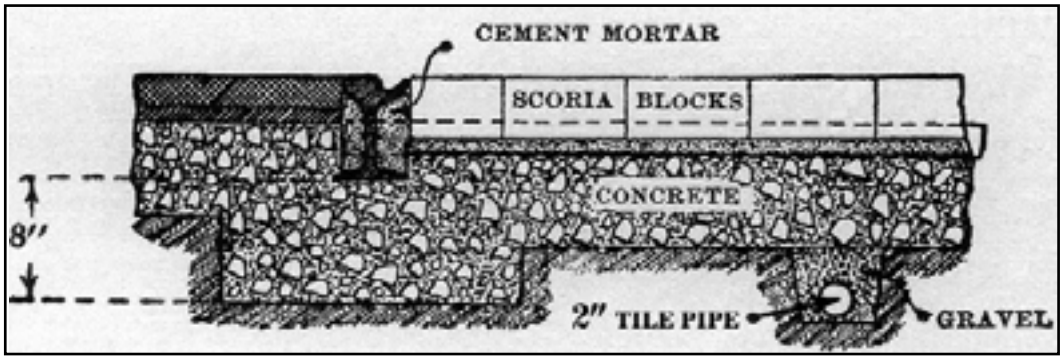


***Fig. 5***
*Cross-section of streetcar track construction in Toronto, ca 1900 (George Tillson,* Street Pavements and Paving Materials: A Manual of City Pavements, the Methods and Materials of Their Construction *(2nd ed., New York: John Wiley & Sons, 1912), 507)*

$2.75 per square yard.[80] This would put the cost at $24,200 per fifteen foot mile. Even at this lower price (and we must also account for the annual cost of repairs), it is easy to argue that wooden-block or brick pavements were more cost-effective than asphalt. It also means that at $2.50 to $2.75 per square yard, kreodone-creosote wooden-block pavement on a concrete base provided a road surface competitive with asphalt in price and cleanliness and appearance, and was far more cost-effective in terms of durability.

We also know from Table 1 that the second pavement of choice was brick on concrete, 27.5 miles of which was laid between 1890 and 1900. Brick-on-concrete pavement, again, on average exceeded the cost of asphalt, though not in Toronto. It was noise- and dirt-prone and played havoc with animals and vehicles, unlike wooden-block pavement. But, as Engineer Ellis suggested, a worn-out brick pavement provided an excellent foundation for an asphalt road.

## Bicycles and Pavements

The following appeared in Ira Osborne Baker's *Treatise on Roads and Pavements*:

> *A bicycle in the eyes of the law is a vehicle and is entitled to travel upon the public highways subject to similar rights of other travelers; and the bicycle has come into such general use that a reasonable provision for this class of traffic should receive the careful consideration of all officials charged with the care of public highways. It is frequently claimed that the bicycles outnumber other vehicles six to one; but this can be hardly true for the whole country, although it may be true in the cities. It is certainly true that the use of the wheel has extended to every profession and occupation in life, and that the bicycle has become a familiar object in every civilized land. The great number of men and women who use the bicycle as a conveyance both for business and for pleasure are rightly entitled to be placed upon an equal footing with pedestrians who use the sidewalks and with those who ride in other vehicles upon the carriage ways.*[81]

Originally published in 1903, Baker's road engineering textbook rightfully acknowledged the wide popularity of cycling in the 1890s and 1900s. But why does Baker adopt a moral position concerning cycling? Why would he insist that the bicycle be democratically recognized as a "conveyance" equal to pedestrianism and cart and carriage use? The answer may have something to do with the predilection for the bicycle that I attribute to Toronto's city engineers, and attempt to demonstrate below.

Toronto's City Engineer's office held that "increased condition of pavements produced increase in travel and tonnage hauled," an indisputable economic transportation principle.[82] Yet, the discussion up to now refutes the claim made by the City Engineer's office for the economic advantage of asphalt. In Toronto, asphalt on certain downtown streets was decidedly not cost-effective, particularly when the city had so much trouble affording repairs. As Tillson wrote,

> *it by no means follows that the decision as to what is the best paving material for one locality will necessarily govern in another, however intelligently it may have been reached. There are so many conditions affecting this question that it must generally be decided by their careful study in each particular case. For instance, stone may from its proximity and availability be just the material for one city and the cost of transportation make it prohibitive for another, and some other material must be used.*[83]

In their continuous recommendation of asphalt, Toronto's engineers display a preference for aesthetics and modernism, not for economy.

Toronto, moreover, was in the interesting position of owning the streetcar tracks. The city had, however, granted the exclusive privilege of operating them to the Toronto Street Railway Company. In the agreement made between the city and the company, the latter was required to maintain satisfactorily all the ties, stringers, rails, turnouts, curves, etc. The company was responsible for any subsequent paving or alterations to the streets and tracks, *the city engineer having complete discretion over the manner of repair and material used*.[84] So the question remains: why did the city engineers insist on the recommendation and use of asphalt? Road engineers agreed that streetcar tracks had posed engineering problems for years and were "detrimental to any pavement" and particularly to asphalt (Fig. 6).[85]

We have already seen that City Engineer Keating supported Council Mayor Shaw's scheme to pave the devil strips. We know that engineers Rust and Ellis supported asphalt. We also know, through Tillson's reporting above, that Toronto's city engineers listened to Toronto's cyclists. Why? Perhaps a 25 March 1898 meeting of the officers of the CWA, the Toronto Cycling Association, four city aldermen and city engineers, held in the City Engineer's office, offers a clue.[86]

The CWA called the meeting to address the problem of Toronto's streets and track allowances, their condition being so degraded that, at a later date, Consul Howson of the CWA would request permission to convene a protest at High Park: "With over 30,000 wheels in Toronto…the interests of such a large body of citizens are not being cared for."[87] At this meeting, however, Howson "argued that with the $29,524 to be yet expended to the city in road improvement a start should be made to fix the roads between the tracks on Carlton, College, and Queen Street west, and the cyclists were promised the work would be pushed through at once." In other words, devil strip repairs were to be made a priority. The aldermen present, Saunders (Chairman of the Board of Control), Crane, Hanlon, Boustead and Sheppard, heartily agreed, adding proposals of their own:

> *Ald. Boustead was in favour of having Victoria Street, from Queen to Gerrard, rolled and picked with the city machines, so that it would also be a good cycling thoroughfare. Ald. Sheppard promised to take in hand a petition for a new pavement on Adelaide street, from York to Bay, which if successfully proceeded with, will give an excellent asphalt route from Church street to Spadina avenue…It was also proposed to asphalt Adelaide street from Church to Jarvis. Chairman Saunders of the Board of Control, promised to do all in his power to further the interests of the wheelmen.*[88]

These were significant promises made by influential politicians in Toronto in the presence of engineers capable of effecting them, given the engineers' control over track repairs.

It is entirely plausible that Toronto's engineers favoured cycling and used their influence to manufacture an environment conducive to the success of the bicycle; they would also, like Tillson, be quite aware of the city's many cyclists — Howson's figure of 30 000 is suspect. The *Annual Report of the City Engineer of Toronto of 1895* takes specific notice of cyclists using the roadways: "regard[ing]… the extensive use of the asphalt pavements by the numerous bicycle riders in this City, it is almost more important to keep the asphalt roadways in perfect order to avoid accidents, as it is almost impossible to notice holes in the surface after dark owing to the colour of the material."[89] This concern makes sense since, as has been shown elsewhere, Toronto had an affinity for the bicycle, which abetted a desire to beautify the human space of a city waning physically under the demographic pressures of late-Victorian industrialism.[90]

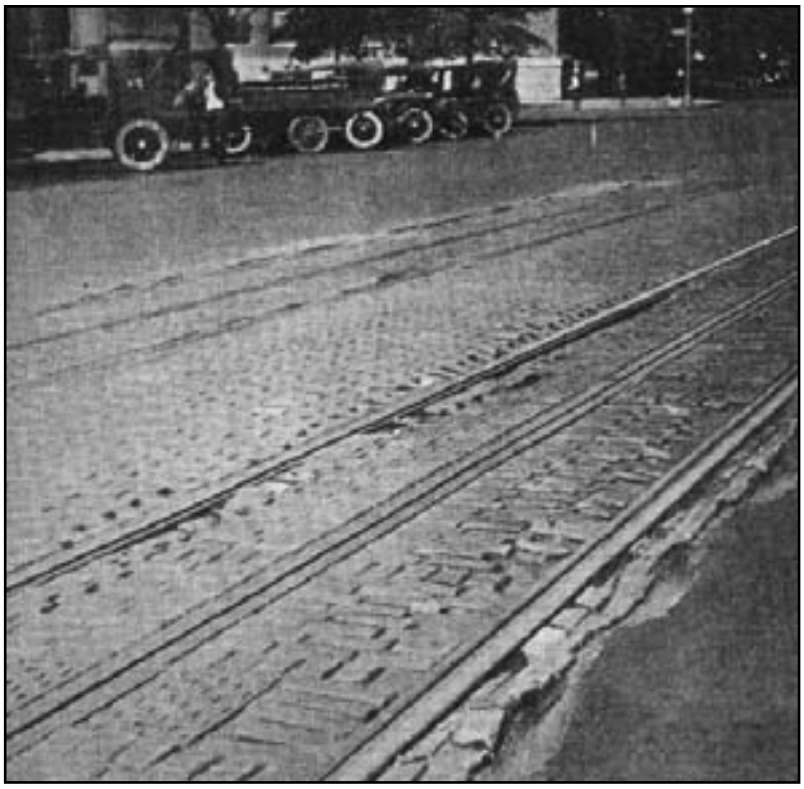

***Fig. 6***
*Deteriorating streetcar pavement in an unknown city, ca 1920 (F. S. Besson,* City Pavements *(New York: McGraw-Hill, 1922), 89)*

This last point is important. Toronto's genteel cyclists represented a cosmopolitanism that self-conscious urban reformers, desirous to make Toronto a "world-class city," could not ignore.[91] Bicycles, as well as asphalt, moreover, represented the efficacy of technological modernism.[92] Modernizers such as Toronto's city engineers associated decorum and beauty with the bicycle, as well as modern efficiency.[93] Observers in Toronto saw, with increasing frequency, neat couples or small, fashionable groups of women and men out for a "gentle wheel" in the streets of the city at twilight;[94] Toronto's pedestrians and street-watchers could see "tides" of handsome wheelwomen and wheelmen "between Yonge street and High Park [cycling]… steadily westward during the morning and early part of [a weekend] afternoon, while the shades of dusk see the same crowds of pleasure-seekers returning to their homes."[95] Torontonians witnessed "fathers, mothers and children riding in family groups," and noted their "unmistakeable respectability."[96] Bicycle owners in Toronto could take part in bicycle gymkhanas, where the best-decorated bicycle, though not necessarily the most athletic rider, took the prize.[97] Mostly, contemporary observers witnessed a "wonderful increase in the number of riders," which only increased "the influence of Toronto's cyclists."[98]

The city engineers belonged to a professional class of Torontonians who held beauty and order in high regard; we may speculate that some of the engineers themselves were cyclists, given both the mechanical engineering marvel that the bicycle represented and its social status among elites. Asphalt pavement did more than redeem the appearance of both the built and human space of the city: it also promoted the presence of handsome bourgeois female and male cyclists in the city at a time when middle-class Torontonians complained vociferously about the disorder and ugliness of Toronto's streets.[99] We know this was an era of profound bourgeois expression in and influence over public space; geographers have documented the bourgeoisie's association of their elevated and domesticated ideals and values with urban landscapes.[100] Asphalt, as a symbol of beauty, hygiene and order, was not only a functional pavement but one with an ideological hold on a society obsessed with urban spatial orderliness and control.[101] Asphalt, too, was a modern novelty, a *de rigueur* technology. Was asphalt, for bourgeois city engineers who regarded the position of city engineer "as the most important director of the material development of cities" — a materiality that promoted bourgeois aesthetics — simply irresistible?[102] This would explain Toronto's engineers' attraction to a modern pavement that patently failed in many of its urban applications, while encouraging beautifying activities such as cycling.

## Conclusion

Road Engineer Clifford Richardson suggested, in a discussion of "the merits of modern sheet-asphalt pavement," some of the main reasons for using asphalt:

> *1. It does not disintegrate under impact or attrition, and consequently produces neither mud or dust.*
>
> *2. It can be kept perfectly clean if the proper efforts are made to do so…*
>
> *7. Deterioration in a standard asphalt pavement is of a kind that can be readily and economically met owing to the simplicity of making repairs…*
>
> *9. It increases the actual and rental value of all real estate abutting on streets where it is laid to a larger extent than any other form of pavement.*[103]

Toronto's asphalt streets, however, both compare to and contrast with Richardson's assertions here. Asphalt in Toronto's central business district was a "signal failure." Granted, it was used with a "lack of intelligence," which Richardson believed led to its deterioration. Nevertheless, asphalt drew public and professional acclaim for its cleanliness, look and lack of odour; reformers used "beauty," "hygiene" and "asphalt" in the same breath. And if the city struggled with repairs, despite the public outcry or even the Council's bicycle-based affinity for good roads, asphalt's beauty and hygiene still acquired capital value in a consumer society, and so its use as a pavement mattered. Toronto frequently laid asphalt for appearance and its benefits, though not always for effectiveness.

City engineers promoted asphalt in Toronto, citing the lack of cost-effectiveness of cedar blocks. This ruse to embed in the city landscape another equally uneconomical pavement is significant. Asphalt was "modern." Its presence symbolically modernized Toronto. We may well speculate that Toronto's city engineers, as professional modernizers, regarded the use of any other material, especially wood, as an anti-modern resignation to horses and carts, along with manure, dust and mud, always being with them. Asphalt pavement applied art and science to roads. It was indicatively modern.

In Toronto, asphalt pavement increased the presence and influence of bourgeois cyclists as well as the city's capacity for beauty. And given their accommodation of cycling in Toronto, the city engineers seem to concur with the engineering ideas of Ira Osborne Baker: the bicycle *had* "come into such general use" that "all officials charged with the care of public highways" must give it "careful consideration." It is important that Toronto's engineers understood that Toronto's Mayor, Board of Control chairman and various aldermen supported cycling. Such support intimated that Toronto was committed to attracting fashionable modern people to its increasingly cosmopolitan streets.

To end where we began, the material landscape of the city is richer than a traditional cultural geographic investigation of its forms, or surfaces, can demonstrate. There is nothing intrinsic to one of the modern city's most prosaic attributes, asphalt pavement, that would indicate the ideological tendency of city engineers in late-Victorian Toronto to aestheticize its use, or privilege its hygienic orderliness, visual comeliness and noiseless utility; this was a city known for many years as "muddy York," (the latter being its name before incorporation in 1834). Toronto's city engineers approached the use of asphalt primarily politically and ideologically. Asphalt pertained to moral imperative first, and then to utilitarian common sense. If asphalt were ever merely practical, it was first a bourgeois solution to spatial impropriety in *la ville de la fange*. And this is something asphalt "itself" cannot disclose.

**ACKNOWLEDGEMENTS**

Thanks to Peter Goheen, Brian Osborne and anonymous reviewers for comments on drafts of this work at various stages.

**EDITOR'S NOTE**

Imperial measurements have been used throughout this article, in keeping with the background documents referenced.

**NOTES**

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36. *Annual Report of the City Engineer of Toronto for 1896* (Toronto: The Carswell Co., 1897), 33–34; City of Toronto Archives.
37. Earle, *Black Top*, 42; Blanchard and Drowne, *Highway Engineering;* Smith, *Dustless Roads.*
38. *Daily Mail and Empire* (2 April 1898): 6.
39. *Daily Mail and Empire* (10 May 1898): 6.
40. *Daily Mail and Empire* (9 July 1898): part two, 6.
41. *Daily Mail and Empire* (23 February 1898): 10.
42. *Daily Mail and Empire (*19 April 1897): 7. A "devil strip," commonly, is a narrow strip of land. In this essay I am identifying the paving between the rails, and the paved area between opposite running tracks, as devil strips.
43. *Daily Mail and Empire* (20 April 1898): 8.
44. *Daily Mail and Empire* (12 March 1897): 4.
45. *Daily Mail and Empire* (22 March 1897): 4.
46. Marshall Berman, *All That Is Solid Melts Into Air* (New York: Penguin, 1981), 155–171.
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48. Berman, *All That is Solid,* 160–161.
49. *Annual Report of the City Engineer of Toronto for 1896* (Toronto: The Carswell Co., 1897), 17; City of Toronto Archives.
50. *Daily Mail and Empire* (3 July 1897): 10.
51. *Daily Mail and Empire* (16 April 1897): 10.
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53. F. H. Leacy et al., eds., "Transportation and Communication," *Historical Statistics of Canada*, 2nd ed. (Ottawa: Statistics Canada/Social Science Federation of Canada, 1983), T163–194. Ontario shows 178 registrations for 1903; the number of registrations for all of Canada in the same year was also 178.
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57. William P. Judson, *City Roads and Pavements Suited to Cities of Moderate Size*, 2nd ed. (New York: The Engineering News Publishing Co., 1902), 77.
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59. Baker, *A Treatise on Roads and Pavements*, 560.
60. Between 1901 and 1911 only one half-mile of wooden-block pavement was laid. *Annual Report of the City Engineer of Toronto for 1911* (Toronto: The Carswell Co., 1912), 168); City of Toronto Archives.
61. Judson, *City Roads and Pavements*, 66.
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66. Letters, "Our Street Pavements," *Daily Mail and Empire* (7 May 1898): 12.
67. *Daily Mail and Empire* (20 April 1898): 8.
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73. Judson, *City Roads and Pavements*, 119.
74. Tillson, *Street Pavements*, 506–507.
75. W describes how Toronto overpaid, it having to do with application: "In laying pavements the asphalt coating is composed of from 12 to 15 parts asphalt, and from 88 to 85 parts sand. Excavating the roadway costs 20 cents per square yard; 4-inch beds of concrete are laid for 45 cents per square yard, and a 2-inch coating of asphalt for 50 cents per square yard, a total of $1.15 per square yard, for which this city has paid the contractors from $2.50 per square yard and over. When the concrete is six inches deep, and the asphalt four inches thick, the cost is $1.60 per square yard, and the contractors have got from $2.70 per square yards, and upwards as high as $3.75, thus raking in an enormous pile as profits, and giving the city, as Mr. Rust now reports, a most unsatisfactory roadway." Letters, "Our Street Pavements," *Daily Mail and Empire* (7 May 1898): 12.
76. Hughes and Foster, *The Dominion Educator*, 2759.
77. (5280 ft/mile × 15 ft. width × $3.10/sq. yard) ÷ 9 sq. feet/sq. yard = $27,280 per fifteen foot mile of road. Thanks to an anonymous reviewer for this equation, which restates an earlier one.
78. Judson, *City Roads and Pavements*, 26.
79. Baker, *A Treatise on Roads and Pavements*, 293; "The Canadian Dollar and the U.S. Greenback (1862–1879)," *A History of the Canadian Dollar,* accessible from the Bank of Canada Web site, www.bankofcanada.ca/en/dollar_book/full_text-e.htm. Note that with "the suspension of gold convertibility in August 1914, the Canadian dollar traded in a very narrow range close to parity

with its U.S. counterpart throughout the war years. In 1918, however, the Canadian dollar began to weaken, and its decline accelerated during the two-year period following the end of hostilities, until it reached a low of roughly US$0.84 in 1920. The weakness of the currency reflected excessive monetary expansion during the war, which continued in the immediate postwar years partly because of the financial needs associated with demobilization as well as the related deterioration in Canada's balance of payments ("Canada Off the Gold Standard (1914–26)," *A History of the Canadian Dollar*).

80. *Saturday Night* (15 December 1888): 1.
81. Baker, *A Treatise on Roads and Pavements*, 624.
82. *Annual Report of the City Engineer of Toronto of 1895* (Toronto: The Carswell Co., 1896), 34; City of Toronto Archives.
83. Tillson, *Street Pavements*, 148.
84. Tillson, *Street Pavements*, 492, emphasis added. As we have seen in W's letter, the street railway company did not always live up to this agreement.
85. Ibid., 486.
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87. *Daily Mail and Empire* (5 May 1898): 8.
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