

THE GREENING OF BALTIMORE'S ASPHALT SCHOOLYARDS*

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ABSTRACT. Asphalt was becoming an integral part of the urban American landscape by the end of the nineteenth century. Not only was it emerging as the preferred alternative for street paving, its promoters were endorsing it for other purposes as well. Although Baltimore was not in the vanguard when it came to adopting asphalt for road surfaces, it soon followed the trend. Like other cities, it too found other applications for this versatile petroleum product, including the paving of playgrounds and schoolyards. Despite low maintenance costs, widespread use of asphalt as a recreational surface started to meet resistance in Baltimore during the 1960s. Fifty years later, stringent storm-water runoff requirements are causing city officials to rethink how they deploy asphalt in an urban setting. In an effort to meet these new requirements, while at the same time improve recreational opportunities for school children, an alliance of government agencies, nonprofit organizations, and private developers has developed a strategy to remove asphalt from schoolyards---one that may serve as a model for other cities facing financial and sustainability challenges similar to those of Baltimore.

Keywords: asphalt, Baltimore, urban greening, urban storm water, urban sustainability.

There are nights when he goes off by himself, and wanders through Brooklyn or the Bronx, taking buses or elevated trains to the end of the route, exploring along the quiet streets. More often he walks through the slums at night, savoring the particular melancholy of watching an old woman sitting on her concrete stoop, her dull eyes reflecting on the sixty, seventy years of houses like this and streets like this, the flat sad echo of children's voices rebounding from the unyielding asphalt.

---Norman Mailer, *The Naked and the Dead*

In his boyhood where they had played only the games where a ball soared, the baseball a black speck in the wheeling sky and the fat basketball grazing the auditorium rafters and the football finding the fingertips of the galloping end. The old elementary school, a Gothic fortress rising from an asphalt lake, was boarded up, with revolutionary and racist slogans spray painted across the weathering plywood.

---John Updike, *The Egg Race*

Working on the highway, laying down the blacktop
Working on the highway, all day long I don't stop
Working on the highway, blasting through the bedrock
Working on the highway, working on the highway

---Bruce Springsteen, *Working on the Highway*

It would be difficult to describe the physical landscape of an American city in the middle years of the twentieth century without mentioning asphalt. Its prominence is captured in photographs and film, art, music, and literature: from the cityscapes of Edward Hopper and movies like *Hancock*, to the works of Norman Mailer, John Updike, and Bruce Springsteen. Once its advantages over other materials---most notably cobblestone, concrete, and wooden block---became widely known, asphalt's promoters and producers secured its dominance in the competition to pave America's streets and highways. It has smoothed the way for generations of automobile drivers and transformed our urban landscapes. Today, it is so commonplace a material we hardly notice it. Noting that the planet's human population is "rapidly, if unevenly, urbanizing," Jennifer Wolch reminds us that much of the urban world we inhabit now is grey and paved with asphalt (2007, 373). It is the most common paving material in the United States (Holley 2003).

Although widely used, asphalt---a dark and sticky bituminous substance composed chiefly of hydrocarbons and often mixed with sand or gravel---is increasingly viewed in a more negative light (Holley 2003). Storm-water runoff from asphalt streets and highways, alleyways, parking lots, playgrounds, schoolyards, and other impervious surfaces is linked to flash flooding, channel instability, water-quality impairment, and damage to aquatic habitats (Pyke and others 2011). Along with other urban construction materials, such as concrete and bituminous roofing, blacktop absorbs, stores, and emits more thermal energy than

natural surfaces, contributing to the urban heat-island effect (Stone, Vargo, and Habeeb 2012). As a consequence, cities throughout the United States and elsewhere are seeking to replace asphalt---wherever practicable---with cooler, more permeable surfaces.

As urban planners and resource managers explore alternatives to asphalt, now is an especially opportune time to ask why asphalt roads were adopted in the first place, why city officials promoted asphalt for other purposes, and how communities might benefit from and finance its removal. Using archival sources and interview data, this paper focuses on Baltimore, Maryland's, experience with asphalt. After a brief historical overview of asphalt use in U.S. cities, we consider problems associated with its application today. We then give an account of asphalt's tumultuous rise to prominence as the preferred alternative for Baltimore's roads during the early 1900s. Next, we focus on asphalt as a replacement for other surfaces, particularly schoolyards and playgrounds. Ironically, it was the Women's Civic League---an organization known for its efforts to beautify the city---that campaigned vigorously for the creation of asphalt playgrounds. Finally, we direct our attention to efforts aimed at curtailing the spread of asphalt playgrounds in the city---a movement that begins in the 1960s and concludes with Baltimore's recent initiative to "green" schoolyards by replacing asphalt with more permeable surfaces.

Humans have long used asphalt for a variety of purposes. Its first recorded use for road construction was in Babylon in 615 BCE. The Greeks and Romans were also familiar with asphalt's properties, using it as a sealant for baths, reservoirs, and aqueducts. Taking advantage of natural deposits discovered off the coast of Venezuela, Sir Walter Raleigh used asphalt to recaulk his ships in 1595 before heading out to sea again (National Asphalt Paving Association 2016). Despite its virtues, hundreds of years would elapse before Europeans and, later, Americans would use it as a substitute for cobblestones, granite blocks, wooden blocks, and brick.

In 1870, Newark, New Jersey, became the first U.S. city to successfully use asphalt from Trinidad, which along with Venezuela soon became a major American supplier. By the early 1900s, "artificial" asphalt left over from the petroleum refining process was quickly gaining market share (Holley 2003). Encouraged by Newark's success, Washington, D.C., replaced its aging wooden-block streets with asphalt at the urging of President Grant. By the 1880s, recounts I.B. Holley, the District of Columbia had "paved some seventy miles of streets with Trinidad asphalt, with most of the work being done by the Barber Asphalt Paving Company, which secured contracts in many other U.S. cities inspired by Washington's success" (2003, 709). In 1896, New York City followed suit, electing to use asphalt for its roads in place of brick, granite, and wooden block (National Asphalt Paving Association 2016). Increasing demand for paved streets--led by cycling organizations like the League of American Wheelmen and other

advocates of the Good Roads Movement---induced “growing numbers of contractors to enter the asphalt business” (McShane 1997; Holley 2003, 712; Reid 2011).

With the advent of the automobile, demand for smooth roadways only increased. As Christopher G. Boone and Ali Modarres point out, one of the most important infrastructure improvements in the “modern” American city was the development of paved roads (2006, 97). Asphalt’s ready supply and low cost compared to other materials gave it an important advantage. Before automobiles were widely used, it offered better footing for horses than cobblestones and granite blocks. Unlike plank roads and wooden blocks, it was less slippery and did not absorb odors (Boone and Modarres 2006). Road engineers preferred it to concrete because it was easier to dig up asphalt to repair underground water, gas, and sewer lines (Holley 2003). As a result, about 93 percent of all paved roads and highways in the United States are surfaced with asphalt (National Asphalt Paving Association 2016).

Asphalt has always had its critics, however. In the late-nineteenth century, there were those who feared its use would increase traffic speeds and cause housing values to drop. Others opposed the tax hikes associated with new paving projects (Holley 2003). Today, growing concerns over water quality, in particular, have caused decision makers in many cities to reevaluate the indiscriminate use of asphalt. With respect to storm water, Andrew Karvonen notes that efforts to redirect rainfall were particularly pronounced during the early twentieth century when concrete and asphalt pavements spread rapidly to support new urban

transportation infrastructure (2011, 10). These new durable pavements, along with other aspects of the built environment, altered the hydrological cycle and created an urban-runoff problem (Boone and Modarres 2006; Grove and others 2015). Intense rain events could make matters worse. Writing about the Los Angeles River, Matthew Gandy explains that “the increasing conversion of the city’s surface into roads and parking lots served to amplify the potential impact of sudden downpours by directing runoff straight into the city’s simplified network of concrete channels in a matter of minutes” (2014, 158).

In addition to unmanageable volumes of water, runoff from streets, sidewalks, parking lots, and other impermeable surfaces generally carries a wide variety of pollutants, some of which are capable of altering the chemistry of local streams (Kaushal and others 2015). Untreated sewage also poses problems. In their study of the Anacostia River, for example, Rutherford H. Platt and others report that in addition to collecting upstream pollution from the state of Maryland, the Anacostia receives “2 billion gallons of storm water and sewage” from Washington, D.C.’s, “antiquated combined sewer outflows,” making it “one of the ten most polluted rivers in the country” (2008, 130). By the 1970s, an increased awareness of the effects of urban runoff on local streams and soils was attracting the attention of federal regulators and municipal authorities (Colten 2005; Melosi 2008).

Thirty years ago, Anne Whiston Spirn showed us that a city’s built environment can be viewed through the lens of ecology and, further, that if we design our cities carefully we can enhance their livability (1984). Recognizing

that the large-scale engineered fixes and governance structures of the past are neither affordable nor desirable today, urban planners are embracing alternatives that yield both social and ecological benefits. More specifically, these solutions encourage on-site management practices, public-private partnerships, and community involvement in the decision-making process. As we witness the “sanitary city” of the past, with its emphasis on expensive public health infrastructure and reliance on public funding, give way to the “sustainable city” of the future---which casts urban land management in a broader socio-ecological context---we recognize that many of the solutions that were implemented in the past produced problems of their own down the road. Among other things, these include an increase in impermeable surfaces (Olson 2007). While the transition from the sanitary to the sustainable city has been anything but smooth (Pincetl 2010), we nevertheless appreciate the “potential improvements that can be achieved by an ecologically informed urban transformation” (Melosi 2008; Grove 2009; Pickett and others 2013, S16). Nowhere are these changes more readily observed than in the area of storm-water management. In cities like Los Angeles, for instance, an ongoing effort to “green” alleys has reduced impermeable cover, netting social as well as ecological benefits (Seymour and others 2010; Newell and others 2013). In Tucson, school gardens have emerged as sites of “potential socioecological transformation” (Moore and others 2015, 413--414). Elsewhere, blue-green features, from green roofs and vine walls to biofiltration and rain harvesting, are improving water quality, protecting habitat, and reducing storm-water flow (Miller 2008).

In Baltimore, ecologists and social scientists engaged in long-term ecological research are employing a patch dynamics approach to study changing social and ecological conditions in the city (Grove and others 2015). One patch type currently undergoing transformation is the asphalt-covered playground and schoolyard. To understand this transformation we must first review Baltimore's early experience with asphalt as a paving material.

<<A-HEAD>> COMBINE, COMPETITION, AND CORRUPTION

In 1907, Baltimore was still recovering from the infamous fire that destroyed much of its downtown (Olson 1997). It was also wrestling with a serious transportation infrastructure problem. More than a mere nuisance, poor roads were extremely inefficient. Indeed, they were proving unsafe, as this account from the *Baltimore News* suggests:

Ever since the wood pavement was laid on the streets surrounding the Courthouse, shortly after the fire in 1904, that section of the city has been a terror to drivers. The slightest rain or snow makes the pavement so slippery that it is almost impossible for horses to stand up while passing over it and scarcely a wet day passes without a number of horses falling on the pavement. Yesterday, while the snow was falling, and before ashes were scattered over the streets, no less than 23 horses fell on Calvert and Fayette streets. (4 December 1907)

City officials and citizens alike were acutely aware of the problems that unpaved streets, cobblestones, and wooden blocks posed and appeared ready by the closing years of the nineteenth century to take action. In 1895, just forty-nine miles of city streets were “improved,” comprised largely of granite block, sheet asphalt, and asphalt block; three hundred miles were cobbled; and the remaining three hundred were unpaved (Olson 1997, 225). To make matters worse, many of these roadways were in disrepair due to the digging activities of transit and utility companies. “Egged on by the bicycle craze,” residents began demanding “smooth paving” (Olson 1997, 225). However, years would pass before a movement to pave streets throughout the city gathered enough momentum to ensure success.

Progress was so slow it attracted the attention of Baltimore’s resident contrarian journalist, H. L. Mencken. In an editorial published in *The Free Lance* in 1911, Mencken asks: “Why not a permanent organization in Baltimore for warring upon stupidity, flapdoodle and buncome?” He then compiles a list of what he refers to as an “endless saturnalia of bunk, of bluff, of stupidity, of insincerity, of false virtue, of nonsense, of pretense, of sophistry, of parology, of bamboozlement, of actorial posturing, of strident wind music, of empty words---even, at times, of downright fraud.” Coming in at number ten on this ignominious inventory: “[P]ublic commissions discuss interminably the paving of streets---and no streets are paved” (quoted in Joshi Forthcoming). Of course, one must remember that Baltimore was still, in Sherry Olson’s words, a “horsey town” at this time. As evidence she notes that 5,000 buildings were still used as stables and that there were 17,000 licensed horse-drawn vehicles in the city (Olson 1997,

288). Just one year before Mencken's remarks were published, Baltimore constructed a new central stable to accommodate 350 horses and vehicles and operated a thirty-acre farm "for their sick, run-down, or overworked horses" (Olson 1997, 288).

As historical newspaper accounts indicate, cost concerns, trusts, and "politics" presented the most serious obstacles to an efficient paving program. For years, Baltimore had been experimenting with a variety of materials to replace inadequate dirt roads (Figure 1). With lucrative contracts at stake, companies competed with one another to secure awards. Holley contends that in some cities the decision to use one paving material over another fell to "corrupt aldermen" who "awarded paving jobs to conniving contractors" (2003, 725). This statement seems to apply to Baltimore. To maintain a climate of competition, the city passed the Bruce-Fendall Ordinance, which introduced "competition in paving in Baltimore for the first time and puts an end to the old method, by which favoritism ruled in selecting paving materials" (*Baltimore News* 4 September 1906). The goal of the ordinance---named for City Solicitor Bruce and City Engineer Fendall---was to "provide competition among paving materials by putting different kinds of materials against each other" (*Baltimore Sun* 1906, 78).

Passage of the ordinance did not fully restore confidence in the process. The Commissioners for Opening Streets and the Office of the City Engineer still met resistance in some districts, particularly in the "Annex," where residents and their representatives felt coerced into using whatever products companies were peddling. According to one report, the Commissioners for Opening Streets

abandoned the idea of using asphalt to pave the Annex, “due to the fact that the asphalt companies have been antagonizing the city on every side.” In response, “the city now proposed to antagonize the asphalt companies” (*Baltimore News* 16 May 1906). The alternative was to continue paying high prices for wooden-block pavements.

Although a cheaper alternative, the prices asphalt companies charged for their products eventually led to allegations that a trust or combine existed. Ultimately, disputes of this nature were settled in court, with the city seeking to protect its interests, and companies accusing one another of unfair bidding practices (*Baltimore News* 30 May 1906; 21, 22, 27, and 29 June 1906; 5 July 1906). The result was stoppage of work, as this newspaper report suggested: “The pending suit, introduction of which marked the climax in the long-drawn-out-fight to break the grip which the paving combine had on the city, has resulted in all local paving being tied up” (*Baltimore News* 27 June 1906).

Sometimes corporations used their power to influence politicians. Such was the case with the Barber Asphalt Company, a highly successful organization that paved approximately “fifteen hundred miles of streets in more than a hundred cities” between 1876 and 1898 (Holley 2003, 712). In 1906, it took the bold step of attempting to bar A. W. Dow---chemical engineer and inspector of asphalt and cements for Washington, D.C.---from providing expert advice to other municipalities:

That the Asphalt Trust is at the bottom of this fight against one man is not denied. In fact, two years ago, Senator Penrose, the would-be Republican boss of Pennsylvania stated that he had had the proviso inserted at the request of John Mack, the Philadelphia politician who controls the Barber Asphalt Company, and who is commonly reported to be trying to control not only the asphalt field, but the wood block, vitrified brick, asphalt block and the whole paving field. (*Baltimore News*, 23 May 1906)

Other efforts to limit competition and return the city to the “paving tyranny under which Baltimore had sweated for years” were also decried in the news (see *Baltimore News* 11 and 22 March 1910).

Lack of progress could also be attributed to a genuine debate over which were the best and most cost-effective materials to use. In the summer of 1906, as asphalt’s supporters and detractors traded barbs in the pages of the newspaper, Baltimore’s city engineer traveled to London and several other European cities “where the streets are kept in such condition as to excite the admiration of American visitors.” The purpose of his trip was to make a “careful study of the materials used, the method of laying them,” and compare conditions abroad “with conditions at home.” Upon returning to Baltimore, he submitted his findings to Mayor E. Clay Timanus. While he did not recommend wooden block for general use, he did endorse it wherever a “noiseless pavement is especially desirable,” such as streets around hospitals. He suggested adding a thin coating of tar covered by an inch of broken stone to improve traction. He encouraged laying sheet

asphalt “on main thoroughfares outside of the business section, where the traffic is light and the grades do not exceed 2.5 per cent.” He favored bitulithic (containing aggregate) pavement “on main thoroughfares outside of the business section, where the traffic is light and especially where the grades are too steep for asphalt.” He reserved the use of vitrified brick for residential areas, lightly traveled streets, and alleys, noting that, “a well-laid brick pavement should last a great many years” and require little maintenance. Stone or “Belgian” block pavement should be used in the business district where traffic is heavy. For parts of the city “in the process of development,” the city engineer recommended macadam (*Baltimore News* 5 January 1907; 4 December 1907).

Lack of familiarity with asphalt and its properties was also a reason some adopted a more cautious approach to paving city streets. A report from the 12 July 1907 *Baltimore News* is illustrative: “Mayor Mahool got the surprise of his official career yesterday afternoon when he went down to examine the new sheet asphalt-pavement on Gough street. He found in some places, he said, that light vehicles made ruts in the asphalt two inches deep. He was really alarmed. Today, however, he feels better.” After conferring with the contractor, Isaac L. Filbert, City Engineer Fendall, and A. W. Dow, the former inspector for the Washington Street--Paving Bureau, he was reassured that the asphalt that had been laid was of “an exceptionally high grade, and that it is a peculiarity of this asphalt that it is very soft during the first summer, when the light oils are evaporating.” Once these pavements “set,” they would wear well he was told (*Baltimore News* 12 July 1907a). The episode reminds us that a new challenge loomed on the horizon—

constructing roads that could withstand the impact of motor vehicles. This prompted the Maryland Geological Survey to dispatch W. W. Crosby, chief engineer of the Highways Division, on a tour of midwestern cities, “to study the effect of certain experiments that are being carried on in that section along the line of road-building.” The trip was one of several he had undertaken recently “to discover the best possible method to be pursued in the building and repairing of roads in order to prevent their being torn up by automobiles” (*Baltimore News* 12 July 1907b).

As confidence in asphalt as a paving material grew, city officials, elected representatives, and citizens alike came to acknowledge that “patchwork paving” of the city’s streets would no longer suffice. With the number of horses on the decline and automobile ownership increasing sharply, city officials devised “a comprehensive scheme” to ensure that the entire city would be provided with improved streets (*Baltimore News* 23 October 1909). By the mid-1920s, Baltimore was well on its way to achieving this goal.

<<A-HEAD>> “LOTS FOR TOTS”

With asphalt firmly established as the material of choice for the city’s roads, other applications for this versatile product began to emerge. One of the more significant---from the perspective of the early twenty-first century---was to cover vacant lots and, later, schoolyards with asphalt. A key advocate of the strategy was the Women’s Civic League (WCL).

Formally organized in 1911, the WCL was created when “a group of civic-minded women decided in 1910 that conditions affecting health and sanitation in Baltimore City had reached a crucial point” (Women’s Civic League 1961, 1). According to the group’s Certificate of Incorporation, the mission of the Women’s Civic League was to “suggest, obtain, improve and promote desirable and proper living conditions in the City of Baltimore and its suburbs, or elsewhere in the State of Maryland, in respect to hygienic and sanitary matters, cleanliness, recreation, ornamentation, cultivation, the abatement of nuisances of every kind and generally with respect to any and every subject whatsoever which may in any way affect the safety, health, or welfare of the people” (Women’s Civic League 1961, 5).

Working on its own, and in concert with other civic organizations and neighborhood-improvement associations, the WCL compiled an impressive record of achievements (Women’s Civic League 1961; Buckley and Boone 2011). Building on the Clean City Crusades of 1911 and 1915, for example, the WCL convinced the mayor’s office to require metal garbage containers and, eventually, covered garbage trucks. In 1931, the WCL figured prominently in passage of a Smoke Abatement Ordinance to regulate smoke from locomotives. The league also worked tirelessly to pass a new zoning ordinance in 1926 and a housing code with enforcement “teeth” in it. In an effort “to stop blighted areas” and “preserve the beautiful,” the league worked with the Bureau of Recreation and Parks to plant 10,000 flowering crab trees “around schools, hospitals, libraries, museums,

shrines, in parks, along streets throughout the city and highway approaches to the city” by 1960 (Women’s Civic League 1961, 29).

Responding to complaints that “were pouring in regarding the littered streets, uncovered garbage cans, and all the attendant evils,” WCL members and their allies pressured school officials “to teach that a clean city is the responsibility of each citizen” (Women’s Civic League 1961, 32). Ultimately, this led to the group’s Litterbug Campaign, launched in 1951. About the same time, the league initiated a study of the city’s play areas, the results of which indicated a “lack of play space in both blighted and non-blighted areas.” In particular, they were interested in the possibility of “cleaning and surfacing” vacant, city-owned lots and then using them for recreational purposes. Between approximately 1952 and 1956, the WCL’s newly formed Committee on Recreation “had as its special project the development of vacant lots as recreational areas, especially near schools” (Women’s Civic League 1961, 36). A meeting with Mayor Theodore McKeldin resulted in an appropriation of \$29,000 for the “grading, fencing and surfacing” of twelve city lots. Before long, an additional fifty lots would be added into the plan known as “Lots for Tots” (Women’s Civic League 1961, 36).

Perhaps it is not surprising that the WCL promoted blacktop as a surface that would enhance the appearance of these lots. With an emphasis on fighting blight, improving sanitation, and expanding recreational opportunities for children, the WCL found a way to address two problems with one solution. Removing trash and vegetation from vacant lots and paving them with “clean” asphalt made these spaces more presentable to passersby and more accessible to

school-aged children. As this recreational model grew in popularity, asphalt was used to replace grass fields in schoolyards and playgrounds throughout the city during the 1950s, 1960s, and 1970s. For a city with a decreasing population and a declining tax base, asphalt playgrounds and schoolyards proved a bargain to city administrators because they could be maintained at a relatively low cost.

<<A-HEAD>> RESISTANCE TO ASPHALT PLAYGROUNDS

By the 1960s, enthusiasm among residents for blacktop playgrounds and schoolyards was wearing thin. One controversy that played out in the pages of *The Evening Sun* in 1965 pitted residents of Bolton Hill---a neighborhood targeted for urban renewal in the late 1950s---against the Department of Education.

According to reporter Peter Marudas:

A group of irate Bolton Hill mothers today unleashed a barrage of feminine anger at the Department of Education which plans to pave a new playground area scheduled for eventual neighborhood use. "How can children play on an asphalt playground without hurting themselves," exclaimed one young mother. "This is just another case where the city is being unrealistic because every major play area in this neighborhood is presently asphalt"

The 1¼-acre tract of land, situated adjacent to the new Eutaw Elementary School, was intended to serve the school as a playground. Residents argued that too many recreational areas in the neighborhood were already paved and, further, that

children hardly used them. School officials, meanwhile, maintained that an unpaved lot would eventually turn into a “dust bowl or mud hole” (Marudas 1965).

In response, Ambrose J. Chlada, Jr., assistant superintendent for school facilities, said maintenance costs and problems preserving grass on the site required that the city pave the lot. He did offer one concession. In an attempt to “calm the Bolton Hill residents,” he promised that the playground would be paved “not only with traditional street-colored asphalt but new green and brown paving materials,” a move he felt would “brighten up” the proposed play area.

Acknowledging that it would be okay if a portion of the lot were paved, Nancy Hall, leader of a citizens group tasked with surveying the neighborhood’s recreational needs, proclaimed that a 1¾-acre tract of asphalt was simply too much. “Mr. Chlada tells us that we cannot have grass because of a high school population planned for the elementary school next door but we have found larger schools in the city which have grassy playfields” (Marudas 1965).

What Hall found especially galling, however, was that the urban renewal agency operating in her section of the city supported the idea that “paved school playgrounds are adequate recreational facilities for this neighborhood.” Clearly, Bolton Hill residents did not agree. Nor did residents in other parts of the city, such as Harlem Park. In a document listing their requests during the urban renewal process, members of the Harlem Park Neighborhood Council expressed a need for “low-income housing (not high rise housing) for rent or sale, multi-purpose centers, teen centers, centers for the aged, [and] swimming pools.” In

addition to shopping facilities and a school complex, council members also underscored the need for playgrounds---but only if they were “not asphalt” (quoted in Giguere 2009, 129). As an article in the 16 October 1965 issue of *The Baltimore Afro-American* indicates, even the Superintendent of Schools Dr. Laurence G. Paquin was growing weary of asphalt playgrounds: “I count myself among those who want to see an end to the ‘wall-to-wall’ blacktop surfaces which are so characteristic of schoolyards at inner city schools.” And yet more than three decades would pass before the concerns of local residents would be addressed.

<<A-HEAD>> REMOVAL

In the early 2000s, a coalition of nongovernmental organizations, municipal agencies, and developers began to reshape the urban landscape, one schoolyard at a time. Interviews with key actors reveal how a plan to “green” a portion of one schoolyard evolved into a larger movement. Inspired by the Cool Schools LA program, which sought to remove asphalt and plant trees, Frank Rodgers, a watershed forester with the Parks & People Foundation, launched a similar initiative in Baltimore (Rodgers 2012). Working with Guy Hager, also with Parks & People, Rodgers used data from a recently completed urban tree canopy (UTC) study to identify “opportunities where the impervious asphalt footprint” could be reduced. “I was just trying to think of ways to use that information, to take that remotely sensed data and convert it into an actionable piece of information,” Rodgers recalled. “I had the idea to split that data out into parcels, and I looked at

schools first, and . . . [we] created a land cover data set for the city's hundred and some odd schools" (Rodgers 2012). City sustainability planner Beth Strommen recollected that there was a focus on schools because analysis showed extremely low canopy coverage, often as low as four percent. "That's the lowest of the low. That's as low as some of our 'worst neighborhoods' if you will," she acknowledged. "It could be a totally green neighborhood, and the school site showed up with no canopy and high impervious surfaces. It sort of became a priority to get those school sites to average out closer to the rest of the city" (Strommen 2012).

With the dual goal of removing asphalt and improving tree canopy coverage, Rodgers and Hager identified Franklin Square Elementary as an ideal location for a pilot project. Not only did Parks & People have ties to the school through an environmental education program, it had a 1.39-acre playground covered entirely by a decaying layer of blacktop (Figure 2). According to Rodgers, the playground was in such poor condition that children were not permitted to play on it. "It was too dangerous because kids would trip and skin their knee and there would be broken glass on the asphalt. It was an entirely unattractive somewhat, mildly unsafe environment for the kids. So they had a little tiny area that they designated that the kids would go out and play on and they would try to keep that swept and clean, but the vast majority of that asphalt area . . . was off-limits to the students" (Rodgers 2012,). The major challenge was funding. To remove one acre of asphalt, de-compact the soil, add topsoil, and

install grass and other vegetation would cost between \$120,000 and \$175,000 (Traut 2012).

With limited funding, Rodgers and Hager started small. They met with a small group of students and played a “planning game” with them. They asked the students, “If the sky was the limit, what would you do with your school campus? What would it look like if you could do anything you wanted to do?” (Rodgers 2012). The result was a “reading circle,” a grassy spot in a sea of asphalt bounded by a ring of trees (Figure 3). The next challenge was to figure out how to “green” the rest of the schoolyard. That is when Bill Stack with the Baltimore City Department of Public Works (DPW) got involved in the project. “Frank had this project at . . . Franklin Square. But because he didn’t have the engineering background, he asked if I could go out and take a look at it. Which I did, and that got the wheels going in my mind.” Stack visited the site and met with Jeff Barrett, who was groundskeeper for the city schools. “I looked at all the asphalt and it kind of struck me,” recalls Stack. “I asked Jeff, ‘How many schools do you think, in the city, are like this?’ And Jeff said, ‘Dozens.’ That’s when the light bulb went off. . . . I think we both said, ‘We could blow this project up and apply it city wide.’ I really became excited” (Stack 2012).

At that point, a partnership linking Parks & People, DPW, and the city schools began to take shape. After receiving a grant from the National Fish and Wildlife Foundation, which targeted up to seven schools for asphalt removal, and then matching those dollars with capital funds from DPW, Rodgers and his partners had more than enough money to complete the project at Franklin Square

Elementary (figures 4, 5, and 6). Now they began to identify other schools in the city with “extreme asphalt” (Hager 2016). According to Hager, most of these schools were constructed in the 1970s with urban renewal funds and almost all were located in disadvantaged lower-income neighborhoods. In some cases, the asphalt was in such poor condition that weeds three feet in height could be found growing in the cracks. Hager recalls that the grounds crew at Benjamin Franklin Middle School had to “mow the asphalt” every fall before the students arrived (Hager 2016). This provided another important rationale for removing the asphalt from schoolyards: if the asphalt was not removed it would have to be repaired and replaced, and the city did not have the funds to carry out such a task (Hager 2016).

Then the project started to snowball. “You begin removing it and then everyone is asking for asphalt to be removed,” notes Hager. After seeing the results at Franklin Square Elementary, other schools “were looking for green play areas” (Hager 2016). However, they were not the only interested parties. “I was approached by the storm-water manager for the city, who was looking for mitigation projects that developers could use if they couldn't meet their on-site storm-water management requirements,” remembers Stack. “Johns Hopkins University, in fact, was one of the first developers that greened a lot to offset the storm-water management that couldn't be provided on-site. Then all of a sudden there came this growing need and developers were lining up” (Stack 2012,).

Phil Lee, a maritime consultant representing the Maryland Port Authority (MPA), knew there was a demand for sites in the city where developers could

satisfy new storm-water treatment regulations. He remembers that in the early 2000s, the MPA had difficulty obtaining permits for expansion, construction, and renovations at the city's marine terminals: "The problem is that at the marine terminals it's not very conducive to put in best management practices because the terminals are totally developed and used for operation and storage. So I worked with the regulatory people and developed an institutional plan for addressing storm-water management" (Lee 2012). Lee convinced the regulatory agencies that for each terminal, "we would look to see if there was any location that was onsite and if not we would be able to mitigate off site." Soon thereafter, he received a call from the Baltimore city planning office "to see if we would be interested in removing pavement from playgrounds and that's how it all started" (Lee 2012). Hager notes that "for economies of scale," MPA was interested in sites that were at least one acre: "When we started this project and were exploring this idea we did a GIS analysis of all . . . school sites and we delineated the . . . outer perimeters of the site, how much was covered with asphalt, how much was covered with turf and so we started going down the list, looking at what schools had the largest amount of asphalt and what schools we had relationships with and we just started contacting schools, seeing if they wanted to do this" (Hager 2012).

Today, more than twenty acres of deteriorating asphalt have been removed from schoolyards and playgrounds throughout the city as a result of the partnership forged by the Maryland Port Authority, Parks & People, and the Department of Public Works. Add to this the number of acres of asphalt that have been removed by another nonprofit, Bluewater Baltimore, and its partners, and the

figure exceeds thirty acres (Traut 2012). According to Lee, all parties involved benefit from the arrangement. The city replaces asphalt with a permeable surface, one that cuts down on the amount of untreated storm water entering local stream channels, while promoting recreational opportunities for school children. The city also avoids the cost of having to resurface deteriorating schoolyards at sites across the city. At the same time, developers are able to meet more stringent storm-water mitigation requirements by funding off-site greening projects. Meanwhile, a new source of paving material is created as most of the used asphalt is recovered and recycled. And as Lee points out, communities gain as well. “Residents are pleased with the results. It’s all stark one day and then the next day it’s green. It really helps to improve the quality of life in the neighborhoods” (Lee 2012). Hager agrees. Except for the rare occasion where plantings failed due to a poor soil mix, he has “never heard anyone complain about well-maintained grass” (Hager 2016).

Nearly half of Baltimore is covered with impervious surfaces, which has well-recognized consequences for human wellbeing and ecological integrity, especially for the Chesapeake Bay. In 2012, the State of Maryland passed a storm-water utility law requiring ten large urban and suburban jurisdictions to begin collecting a storm-water remediation fee. The purpose is to pay for some of the storm-water costs that depend, in part, on the extent of hard surfaces, and to create incentives for property owners to reduce impervious cover. Not all taxpayers, however, agree with the decision. Dubbed a “rain tax” by some opponents, the storm-water fee will be phased out in Baltimore County by 2017 (Perl 2015). Baltimore City will retain its storm-water fee, but the Baltimore

County case illustrates how residents think about impervious surfaces continues to be controversial more than a century after the first asphalt was laid in the streets of Baltimore.

<<A-HEAD>> CONCLUSIONS

Compared to cities like Newark, New Jersey, and Washington, D.C., Baltimoreans were relatively slow to embrace asphalt as a paving material. Concerns about its quality and durability, worries about competition and trusts, and a haphazard and piecemeal approach to city paving all played a role in delaying its universal adoption. Once city officials and asphalt manufacturers overcame those obstacles, however, asphalt's stock rose. So much so that by the early 1950s it was being employed as an acceptable substitute for grass and ruderal vegetation in city-owned vacant lots. Starting about the same time, the city began paving schoolyards across the city with asphalt, a practice that continued well into the 1970s (Hager 2012).

Opposition to expanding the use of blacktop as a recreational surface emerged in the 1960s, if not earlier. However, nearly forty years would pass before residents saw a reversal in the trend towards asphalt. The staggering cost of asphalt removal coupled with budget cuts during a period of industrial decline and population loss prevented the city of Baltimore from making such an investment. Ironically, these same constraints also prevented the city from repairing and resurfacing schoolyards. New challenges, a different set of priorities, and a

creative partnership forged in the era of the “sustainable city” eventually changed this calculus. Looking for ways to increase permeability, reduce storm-water flow, and promote recreation, an alliance of nonprofits, government agencies, and developers formed a unique partnership that leveraged the funds necessary to remove deteriorating asphalt surfaces at schoolyards and playgrounds. It was an important development that may yet serve as a valuable model for cities in other parts of the country confronted by similar social-ecological problems.

This article began with two literary references to asphalt, both of which speak to its pervasiveness and, seemingly, to its permanence. We conclude with one last literary allusion. Unlike the first two, this one---from Wallace Stegner’s *All the Little Live Things*---highlights the power of nature to resist human control. It is a reminder of what can be accomplished even against great odds.

At her feet the asphalt has been humped into three round hillocks almost as big as grapefruit. The dome of the biggest has cracked partly open. Gophers? Moles? I hope their fingers are sore from trying to tunnel through those four or five inches of steam-rolled asphalt. And I would rather ignore them now, and get the Catlins started home before the shooting. But I have no choice. I go down to the garage and get the pick, and Catlin takes it from me and digs out the biggest hump. You know what is down there, just about ready to force itself through all that macadam? A mushroom. A

dinky mushroom the size of my thumb and soft as cheese.

<<A-HEAD>> REFERENCES

Baltimore Afro-American. 1965. Black Top Tards Must Go. 16 October, 2.

Baltimore News. 1906. Asphalt Is Barred: Annex Commissioners Want None of
It. 16 May, 14.

_____. 1906. Asphalt Trusts Power: Congress Dances When It Says the Word:
National Government's Power Used to Silence Noted Asphalt Expert. 23
May, 5.

_____. 1906. Net Result of Paving Fight. 30 May, 8.

_____. 1906. Asphalt Cos. In Trust---Witness Whinery Admits Existence of
Combine. 21 June, 11.

_____. 1906. Have Been There Before---Witnesses Have Testified for Trust
Elsewhere---Another Admits Soft Impeachment in Trial of the Paving Suit
Today. 22 June, 18.

_____. 1906. Jolt For Asphalt Co.---Barber Concerned Underbid in Every Class--
-Warren Bros, Bitulithic Makers, Spring Surprise by Entering Field---New
Bids Opened. 27 June, 11.

_____. 1906. Barber Co. Loses Again---Its Asphalt Not Up to Baltimore
Specifications. 29 June, 4.

_____. 1906. Paving Work in City again Tied Up---Judge Stockbridge Decides
Bitulithic Case. 5 July, 14.

_____. 1906. Go Slow on Bitulithic. 4 September, 4.

_____. 1907. Makes Report on Paving. Engineer Fendall Gives Result of Trip
Abroad. Does Not Recommend Wood Block---Macadam Should Be More
Generally Used, He Thinks. 5 January, 14.

_____. 1907a. Soft Asphalt All Right. Mayor Not Alarmed Now at Gough
Street's Condition. 12 July, 13.

_____. 1907b. Tar Coating for Roads. Engineer Crosby Makes Important
Suggestion. Trying to Find Way to Overcome Destructive Effect of Autos
on the Improved Highways. 12 July, 13.

_____. 1907. Favors Bitulithic. Engineer Fendall Says It Would Be Better Than Wood Paving. 4 December, 11.

_____. 1909. System Paving a Charter Feature. Revisers are Considering Way to Avoid Patchwork Improvement. Rockbound Merit System Adopted. Former City Solicitor Bruce Instructed to Draw Up Provision Similar to 1896 Bill. 23 October, 12.

_____. 1910. City Hands Tied by Paving Trust's Annex Loan Joker. Would Force Use of Asphalt on All Streets Improved. Destroys Plan to Get Competition. Does Away with Vital Principle Involved in Bruce-Fendall Ordinance. 11 March, 1.

_____. 1910. City Delegation Deserts City on Paving Loan Bill. Field Amendment to Be Favorably Reported Despite Protest. Officials in aXmsX at Padgett Victory. Effect Will Be, It Is Claimed to Force Use of Asphalt on Most of the Annex Streets. 22 March, 1.

Boone, C. G., and A. Modarres. 2006. *City and Environment*. Philadelphia. Penn.: Temple University Press.

Buckley, G. L., and C. G. Boone. 2011. "To promote the material and moral welfare of the community": Neighborhood Improvement Associations in

- Baltimore, Maryland, 1900--1945. In *Environmental and Social Justice in the City: Historical Perspectives*, edited by G. Massard-Guilbaud and R. Rodger, 43--65. Cambridge, Mass.: White Horse Press.
- Colten, C. 2005. Cities and Water Pollution: An Historical and Geographic Perspective. *Urban Geography* 26 (5): 435--458.
- Gandy, M. 2014. *The Fabric of Space: Water, Modernity, and the Urban Imagination*. Cambridge, Mass.: MIT Press.
- Giguere, A. M. 2009. "...and never the twain shall meet": Baltimore's East-West Expressway and the Construction of the "Highway to Nowhere." MA thesis, Ohio University.
- Grove, J. M. 2009. Managing Densely-Settled Social-Ecological Systems. In *Principles of Ecosystem Stewardship. Resilience-based Natural Resource Management in a Changing World*, edited by F. S. Chapin, G. P. Kofinas, and C. Folke, 281--294. New York: Springer.
- Grove, J. M., M. L. Cadenasso, S. T. A. Pickett, G. E. Machlis, and W. R. Burch. 2015. *The Baltimore School of Urban Ecology: Space, Scale and Time for the Study of Cities*. New Haven, Conn.: Yale University Press.

Hager, G. 2012. Telephone interview with G. Buckley. 27 March.

_____. 2016. Telephone interview with G. Buckley. 9 May.

Holley, I. B. 2003. Blacktop: How Asphalt Paving Came to the Urban United States. *Technology and Culture* 44 (October): 703-733.

Joshi, S. T., ed. Forthcoming. *H. L. Mencken: A Saturnalia of Bunk: Selections from "The Free Lance," 1911--1915*. Athens: Ohio University Press.

Karvonen, A. 2011. *Politics of Urban Runoff: Nature, Technology, and the Sustainable City*. Cambridge, Mass.: MIT Press.

Kaushal, S. S. 2015. Urban Evolution: The Role of Water. *Water* 7: 4063--4087.

Lee, P. 2012. Telephone interview with G. Buckley. 14 May.

Mailer, N. 1948. *The Naked and the Dead*. New York: The Modern Library.

Marudas, P. 1965. Bolton Hill Mothers Attack Paved Fields. *Baltimore Evening Sun*, 25 June.

McShane, C. 1997. *The Automobile: A Chronology of Its Antecedents*,

Development, and Impact. Westport, Conn.: Greenwood Press.

Melosi, M. V. 2008. *The Sanitary City: Environmental Services in Urban America from Colonial Times to the Present*. Pittsburgh, Penn.: University of Pittsburgh Press.

Miller, C. 2008. Blue-Green Practices: Why They Work and Why They Have Been So Difficult to Implement Through Public Policy. In *Growing Greener Cities: Urban Sustainability in the Twenty-First Century*, edited by E. L. Birch and S. M. Wachter, 170--186. Philadelphia: University of Pennsylvania Press.

Moore, S. A., J. Wilson, S. Kelly-Richards, and S. A. Marston. 2015. School Gardens as Sites for Forging Progressive Socioecological Futures. *Annals of the Association of American Geographers* 105 (2): 407--415.

National Asphalt Paving Association 2016.

http://www.asphaltpavement.org/index.php?option=com_content&task=view&id=21&Itemid=41.

Newell, J. P., M. Seymour, T. Yee, J. Renteria, T. Longcore, J. R. Wolch, and A. Shishkovsky. 2013. Green Alley Programs: Planning for a Sustainable Urban Infrastructure? *Cities* 31: 144--155.

Olson, S. H. 1997. *Baltimore: The Building of an American City*. Baltimore, Md.:

Johns Hopkins University Press.

_____. 2007. Downwind, Downstream, Downtown: The Environmental Legacy
in Baltimore and Montreal. *Environmental History* 12 (October): 845--66.

Perl, L. 2015. Baltimore County Council Approves Phasing Out Water Fee.

Baltimore Sun, 17 November.

<http://www.baltimoresun.com/news/maryland/baltimore-county/towson/ph-tt-council-rain-tax-vote-rally-1118-20151116-story.html>

Pickett, S. T. A., C. G. Boone, B. P. McGrath, M. L. Cadenasso, D. L. Childers, L.

A. Ogden, M. McHale, and J. M. Grove. 2013. Ecological Science and
Transformation to the Sustainable City. *Cities* 32: S10--S20.

Pincetl, S. 2010. From the Sanitary City to the Sustainable City: Challenges to

Institutionalising Biogenic (Nature's Services) Infrastructure. *Local
Environment* 15 (1): 43--58.

Platt, R. H., T. Beatley, S. Michaels, N. Goucher, and B. Fenstermacher. 2008.

Urban Stream Restoration: Recovering Ecological Services in Degraded
Watersheds: Why They Work and Why They Have Been So Difficult to

Implement Through Public Policy. In *Growing Greener Cities: Urban Sustainability in the Twenty-First Century*, edited by E. L. Birch and S. M. Wachter, 127--151. Philadelphia: University of Pennsylvania Press.

Pyke, C., M. P. Warren, T. Johnson, J. LaGro, J. Scharfenberg, P. Groth, R. Freed, W. Schroeer, and E. Main. 2011. Assessment of Low-Impact Development for Managing Storm Water with Changing Precipitation Due to Climate Change. *Landscape and Urban Planning* 103: 166--173.

Reid, C. 2011. 19th Century Cyclists Paved the Way for Modern Motorists' Roads. *The Guardian*, 15 August. <http://www.theguardian.com/environment/bike-blog/2011/aug/15/cyclists-paved-way-for-roads>.

Rodgers, F. 2012. Telephone interview with G. Buckley. 14 May.

Seymour, M., J. Wolch, K. D. Reynolds, and H. Bradbury. 2010. Resident Perceptions of Urban Alleys and Alley Greening. *Applied Geography* 30: 380--393.

Spirn, A. W., 1984. *The Granite Garden: Urban Nature and Human Design*. New York: Basic Books.

Stack, B. 2012. Interview with G. Buckley. Ellicott City, Maryland. 2 March.

Stegner, W. 1967. *All the Little Live Things*. New York: Viking Press.

Stone, B., J. Vargo, and D. Habeeb. 2012. Managing Climate Change in Cities: Will Climate Action Plans Work? *Landscape and Urban Planning* 107: 263--271.

Strommen, B. 2012. Telephone interview with G. Buckley. 27 March.

Traut, A. 2012. Telephone interview with G. Buckley. 14 May.

Updike, J. 1979. The Egg Race. In *Problems and Other Stories*. New York: Knopf.

Use of Bitulithic Is Upheld. 1906. *Bulletin of the League of American Municipalities* 6 (3): 77--78.

Wolch, J. 2007. Green Urban Worlds. *Annals of the Association of American Geographers* 97 (2): 373--384.

Wolch, J., J. Newell, M. Seymour, H. B. Huang, K. Reynolds, and J. Mapes. 2010. The Forgotten and the Future: Reclaiming Back Alleys for a Sustainable City. *Environment and Planning A* 42: 2874--2896.

Women's Civic League. 1961. *History of the Women's Civic League of Baltimore, 1911--1961*. Baltimore, Md.: King Brothers, Incorporated.

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