

#7 2018

# Green Thoughts

## *Conversations and ideas about growing at the Spring Gardens*

Between nor'easter 3 and nor'easter 4 some Spring Gardeners were out turning over the soil. Older plants weren't stirring much. The ones we started last fall - spinach, red leafed lettuce,

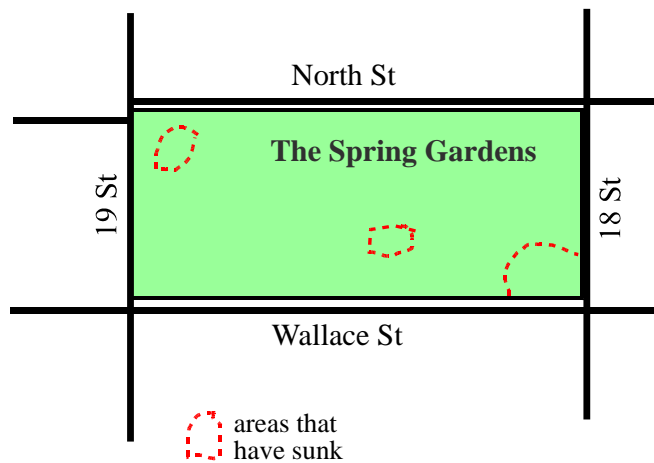
*hydrology*

arugula, broccoli and Brussels sprouts were dozing under their polypropylene blanket ready to begin their growth spurt

*hydrology*

when the temperature regularly rises above 50° F (will it ever? Yes, have faith). Our friend Joe was planting a few short rows of radish seeds. Then came 5 inches of slushy snow. Argh.

Before the snow, we scanned across the Gardens. There was a potentially ominous sign. Some areas have sunk. I had forgotten that there is a patch in the northwest part that is lower than the surround. The central area just north of the sour cherry trees is also lower and forms a pool of standing water after a heavy rain. Most dramatic is the southeast corner. By all accounts it has sunk the most.



We know there used to be row houses in what is now the Gardens. The houses were built between 130 and 150 years ago. When the houses were knocked down, around 30 years ago, basements were exposed as open holes in the ground. They were filled with rubble and dirt. The area was then flattened out. So why the sinking? The vague

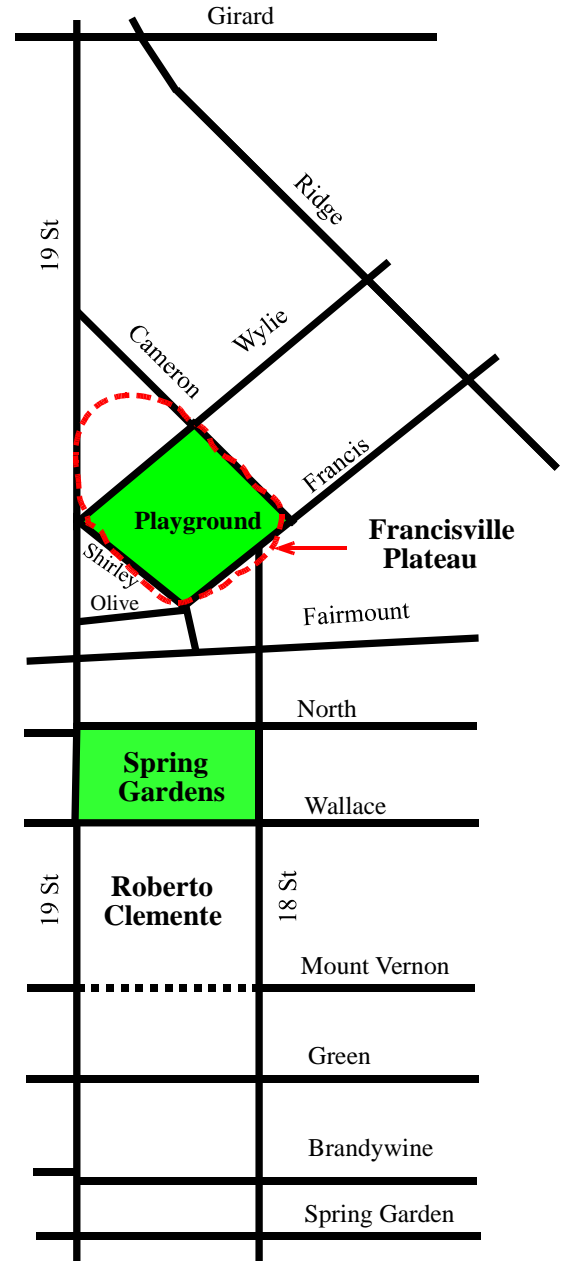
consensus is that the basements in the areas that sunk were not filled with dense, compact stuff. Rains have done the job of doing compaction and hence sinking. The corollary is that, after proper fill is added to the sunken areas, the sinking will slow down and stop. Perhaps.

### Another View

There is an alternative view that the subsidence is more insidious. It is not due to faultily filled ex-basements but underground streambeds that occasionally fill with rainwater that continue subverting the land. What follows is the data and the argument that Green Thoughts has compiled.

### The Lay of the Land

If you start at the Gardens and walk north along 18<sup>th</sup> or 19<sup>th</sup> St you will be walking uphill until you reach the Francisville Playground, a flat, open, square expanse containing a baseball field. The periphery of the playground and the adjacent streets are turned 45° from the surrounding city street grid. On Google maps you can use an app to see that the baseball field is about 10 feet higher than the Spring Gardens. The difference in height is probably not enough to elicit acrophobia or induce developers to get the city to underwrite the building of a ski jump or even for you to become oxygen deprived. But still, a 10 foot rise in about 300 feet is substantial. If you continue north beyond the playground and the adjacent large, triangular, open lot bounded by 19th, Cameron and Wylie streets, you will see you are walking on a gentle *downward* slope as you approach Girard Avenue and the nearby Ridge Avenue. So we can look at the playground as part of a circumscribed plateau which we will call the "Francisville Plateau".



## Building Brick Walls

In what seems like a side issue (it's not) let's talk about brick walls. They are the main kind of outside vertical walls of houses in this area. They are strong, can tolerate large compressive forces and will last a long time if they are built on a sturdy foundation. If the foundation of the wall is so-so and not well constructed, over a long period of time, say the age of our neighborhood, water might undercut the foundation and the foundation can unevenly settle and not maintain a horizontal footing for the wall. The wall above the uneven foundation will be subject to uneven forces. Brick walls are brittle, not flexible. If they have bending forces on them they will tend to buckle, a disaster in the making. Early on, before they can buckle, the walls will tend to bulge. Any half observant owner will notice bulges and bring in professionals to place

metal plates on the outside of the wall. The plates are connected to long, sturdy bolts that anchor the wall to something stable on the other side of the house. Even though there are bulging forces, the counter force by the plates stabilizes the wall. The metal plates usually are star-shaped. The stars do not indicate awards for exemplary buildings or classy building owners. These buildings with stars are outward and visible signs of erosive forces that are undercutting their foundations. Hydrologists tell us that the principal erosive culprit is water underneath the buildings. As you walk around the neighborhood you will see buildings with stars. They are not randomly distributed. They form connected patterns. After we show the pattern we will attempt to suggest what is happening and relate it to the parts of the Spring Gardens that are sinking.



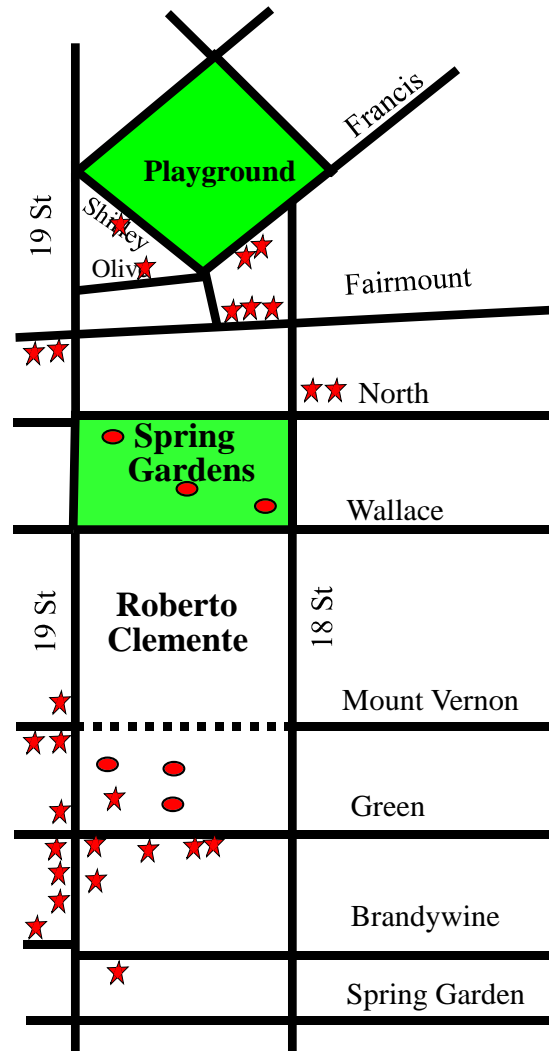
Examples of houses with stars on their front walls. The one on the left is on Francis St adjacent to the Francisville Plateau. Note the neighboring house also has stars on it. The house on the right is on Shirley St. It is also adjacent to the Plateau.

### A walking tour

We hunted for starred buildings and sink holes from east of 18th St to west of 19th St and from the Francisville plateau south to Brandywine St. You can check our data by walking through the neighborhood yourself. The list is shown below. Please note that a few buildings used non-star-shaped metal plates but clearly those plates serve the same function as the stars. The Enon Church does not have plates but there is differential settling on the north side of the church between the main building and the eastern annex. Also, there are sink holes in the parking lot north of the church and there were sink holes in the space of the former school yard now occupied by the dog park.

1913 Brandywine	1900 Fairmount
1836 Brandywine	1912 Fairmount
530 N 19th St	1805 Fairmount
536 N 19th St	1807 Fairmount
535 N 19th St	1809 Fairmount
1900 Green St	627-37 18th St built 1886
1838 Green St	728 Shirley
1806 Green St	1825 Olive
1804 Green St	1810 Francis
1818 Green St	1808 Francis
1901 Green St	560 N 19th St Enon
1900 Mt Vernon	Church & N parking
1910 Mt Vernon	
1901 Mt Vernon	

On the map (right) we show all buildings supported by metal plates (red stars) and current or known previous sinkholes (red ovals). The building at 627-37 18th St (northeast corner of North and 18th streets) was given two stars because it is much wider than a standard row house and has metal plates along its 100+ foot long north and south walls.



How interesting! There is a real concentration of stars and ovals extending south from the Francisville Plateau. If you go more than a half block west of 19th St or more than a half block east of 18th St or go north of the Francisville Plateau you see much fewer sites of metal plate reinforced buildings.

### **Tentative Conclusion**

With the concentration of stars, i.e., foundation- compromised buildings, and the presence of still active sink holes we suggest there is, even now, an underground streambed right beneath our feet. The flow of water through it depends on how much rain occurs at any particular time. So rate of sinking can be quite variable. Rain water seeps into the Francisville Plateau and travels south southwest. The sinking of parts of the Spring Gardens are thus not likely to be a localized condition but tied to the hydrologic conditions of the larger zone shown by the star map.

### **Historic Tie-in**

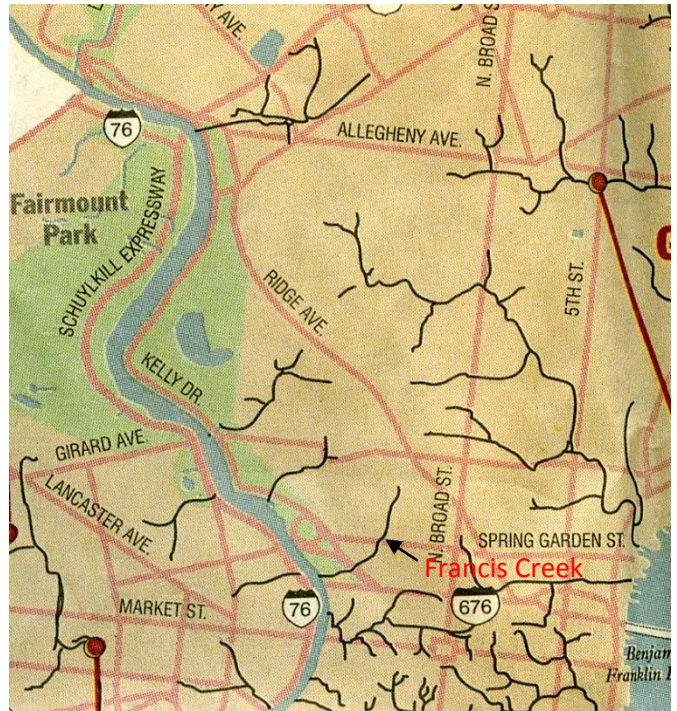
Green Thoughts archivist Ann Northrup found a map published by the Inquirer in 1999. It shows "streams and creeks that once criss-crossed Philadelphia." In 1999 the city was dealing with the aftermath of the sinking of 1,000 homes in the Logan area just north of Roosevelt Boulevard. The houses had been built upon unstable ash and cinder. The subterranean Wingohocking Creek streambed was blamed. We have blown up the part of the map to show the area from Francisville to adjacent neighborhoods. See next page.

Notice the intersection of Girard and Ridge Avenues. Just to the south is the headwater of a stream that runs south-southwest and empties into the Schuylkill right near where I-676 currently crosses the Schuylkill. Where is the headwater of that stream? The Francisville Plateau! The stream is nameless on the map. But let's call it "Francis Creek" (not to be confused with Francis Crick). We may as well personalize the potentially disruptive streambed of the former creek....

### Final Thoughts

Let's wait to see if the below ground streambed of Francis Creek is real (there are skeptics). We can add topsoil fill to the south east area of the Spring Gardens to level it with the nearby land. Reframe the southeast plots. Find a spot on the nearby concrete slab sidewalk and use it as a bench mark. In a year or two we should be able to see if new sinking is occurring. Let's hope not...

**Acknowledgement.** We thank urban hydrologist Professor Laura Toran of Temple University for suggesting changes to the text.



Blow up of part of map from Inquirer 11 July 1999

Please send your ideas, thoughts, suggestions and observations to:

[e.gruberg@temple.edu](mailto:e.gruberg@temple.edu)

that address can also be used for getting on the mailing list for **Green Thoughts**, or getting off.

Prepared by Ed Gruberg