Open Paper Maps

Michal Migurski, Stamen Design

Hello, my name is Michal Migurski and I'm here to talk about getting OpenStreetMap onto paper. In particular, I'd like to talk about the visual design of OpenStreetMap, and a specific project called Walking Papers.

Stamen ♥ OSM

We've done a lot with OpenStreetMap data

I'll start by saying a little bit about Stamen Design.

We're a San Francisco design firm specializing in data visualization and maps.

We work with a lot of clients who have a lot of data: BMW, MoveOn.org, The London Olympics, Digg.com, MSNBC, Trulia.com, Adobe, and others.

We've also been big fans of the possibilities in OSM data for many years.
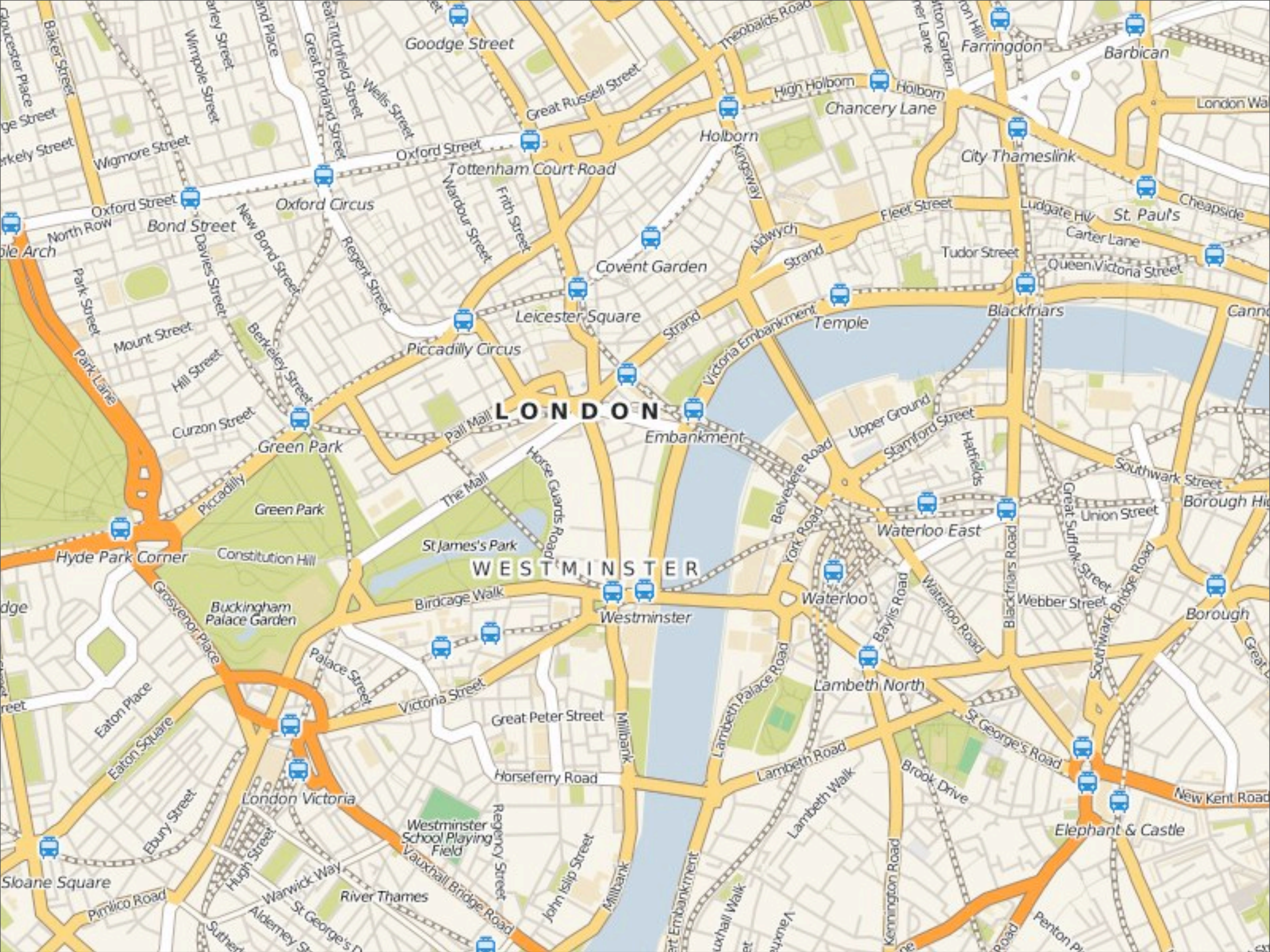
The universe of code that surrounds the open data in OSM has opened a lot of interesting possibilities.

One of the clients we were fortunate to work with this year is Cloudmade.

We designed three new map styles for them.

This is "Fresh", a visual style designed for use on screens. Cloudmade tells us that it's their most-used style.

It was only possible because of the Mapnik rendering library by Artem Pavlenko: it's the thing that makes OSM look so good, it probably wouldn't exist without OSM, and it's available for anyone to use.
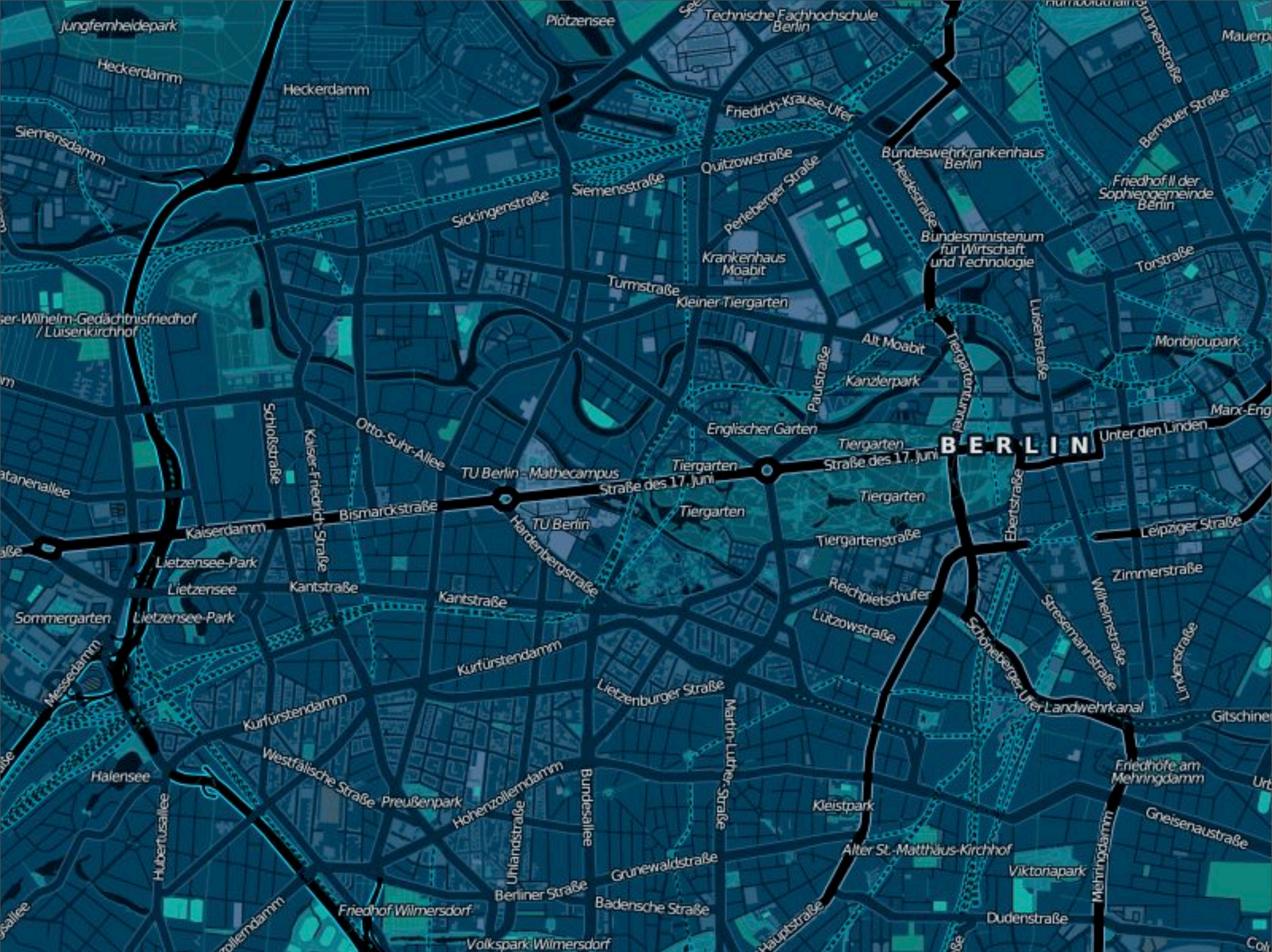
This is another style we did for Cloudmade, it's called Midnight Commander.

The design brief here came from Nick Black, and consisted of this sentence: "I want to have a map style that Jason Bourne would use."

We're fairly certain that there aren't many other online mapping providers offering a design like this.

JS + OSM

Experiments by Tom Carden
http://teczno.com/s/knh
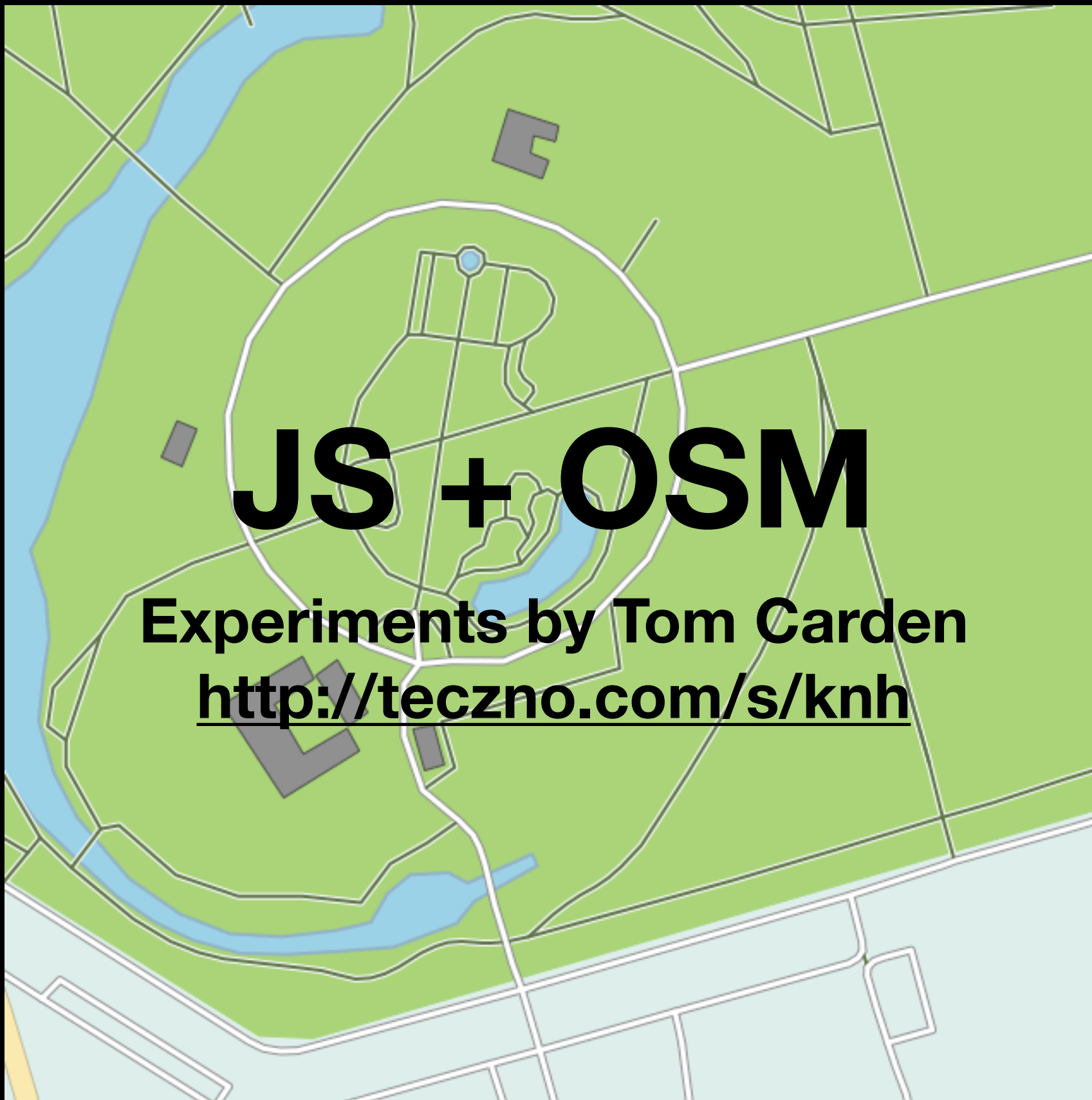
We're equally interested in the technology around maps on the web.

Original OSMer Tom Carden has been experimenting with a rough port of Mapnik to Javascript and SVG, to see what it might look like to render maps on the client side.

It might be possible in the near future to deliver efficient raw vector data directly to the browser.

It's exciting to have access to vector data to do experiments like this.

Heat Maps

Layer order matters for understanding

Here's a heat map where we've taken crime data from our Oakland Crimespotting project and slipped it under a semi-transparent rendered road layer.

Heat maps typically have to sit on top of online maps because of the raster/vector limitation, where they obscure the geographical context for the data they're meant to show, for example by covering up town names.

You can't do much else with Google Maps, but you can with OSM.

This might make it into the Crimespotting project at some point in the near future.
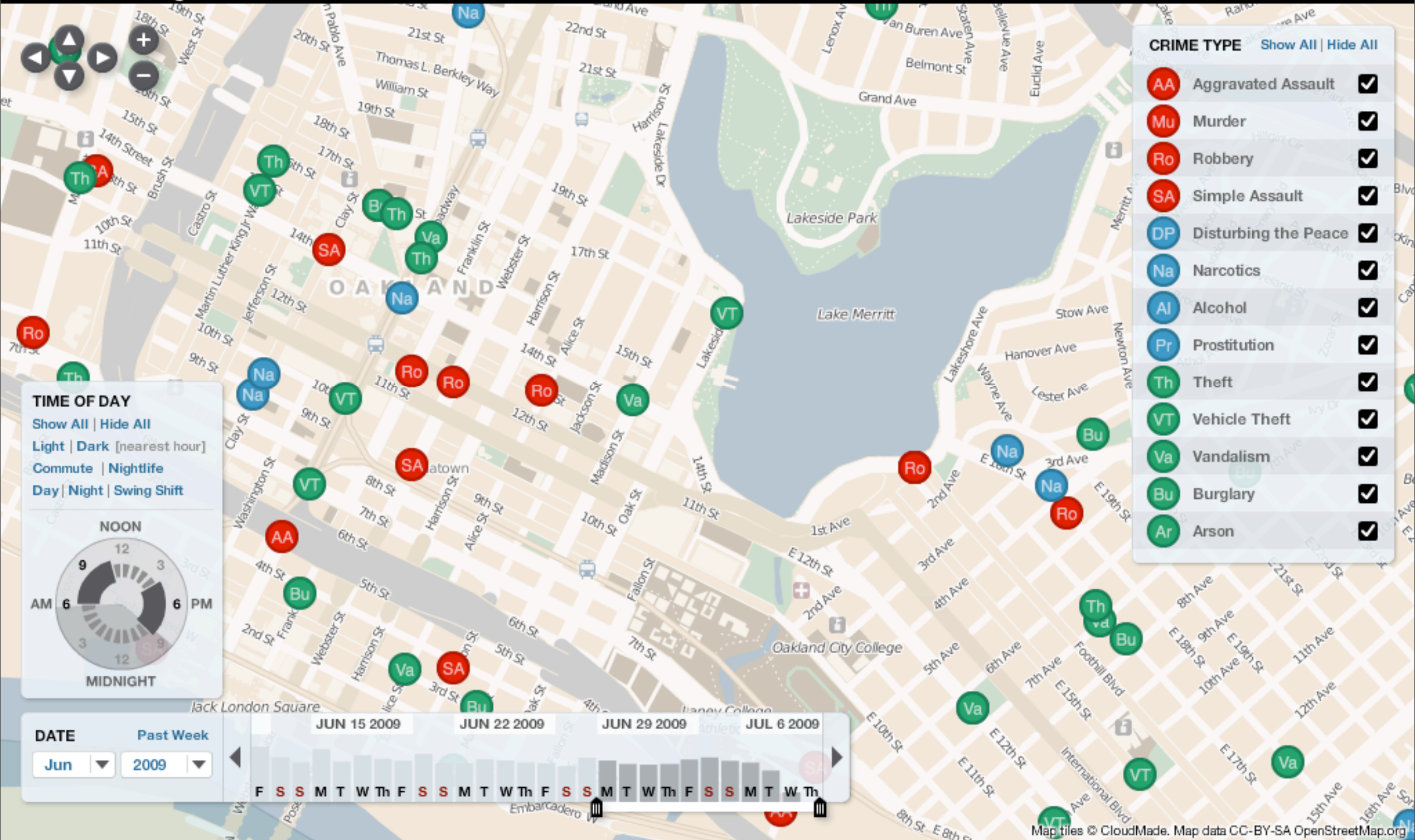
Speaking of Crimespotting, we recently started using our third Cloudmade style, Pale Dawn, in the project.

It looks pretty good with data and interface overlaid on top, because the cartography doesn't compete for attention with the information in the foreground.

City GIS Data

Contours and bike routes by Shawn Allen
http://teczno.com/s/99k

Another prominent source of vector data we have available comes from local governments.

This is a quick map produced by Stamen partner Shawn Allen: it's a combination of contours and bicycle routes published by the city and county of San Francisco.

Some interesting things can happen when you combine this kind of information with OSM data.

Print Styles

Forthcoming SF cycling map

I've been using bicycle maps to think about how OSM can best be expressed print.

There are service like Lulu.com that will take digital files and ship you high-quality printed and bound books for not too much money, so we've been experimenting with map books.

Most of the rendering effort I've seen with projects such as Mapnik has been focused on screen-based output.

Printed maps work differently, though.

They can be more dense.

Streets with sausage casings don't look as good.

Fonts designed to be printed at small sizes, such as Bell Centennial, make more sense here.

Mapnik's Dane Springmeyer has been working on getting resolution dependence into the core library, but until that's released this kind of high–resolution output is going to be a bit of a fudge.

Still, it's interesting to think about the kind of information density you can get away with in a high–resolution format that's meant to be stashed in your pocket and abused.

Here we can see the interaction of street names, bicycle–relevant points of interest, block numbers from City data sets, and those contours from Shawn's map preventing you from doing something foolish like attempting to bike over Telegraph Hill in the upper right hand corner.

Walking Papers

Round-tripping data through print
http://walking-papers.org

As Chris Osborne said yesterday, print is an interesting medium again.

We've got new ways of getting digital data onto paper, like the bicycle maps I just showed.

We've also got new ways of getting paper data into computers.

Walking Papers is about using that as a crutch to make it easier to be a casual, street-level mapper.

http://teczno.com/s/ck3

One interesting enabling technology is the QR Code.

These codes have not penetrated the US or Europe to the degree that they exist in Japan, where every phone handset has for many years had the ability to photograph these symbols and extract the data inside.

You can use Google's static charts API to make them using nothing more than a URL of your own.

You can read the data back out using a library Aaron Cope's ws-decode.
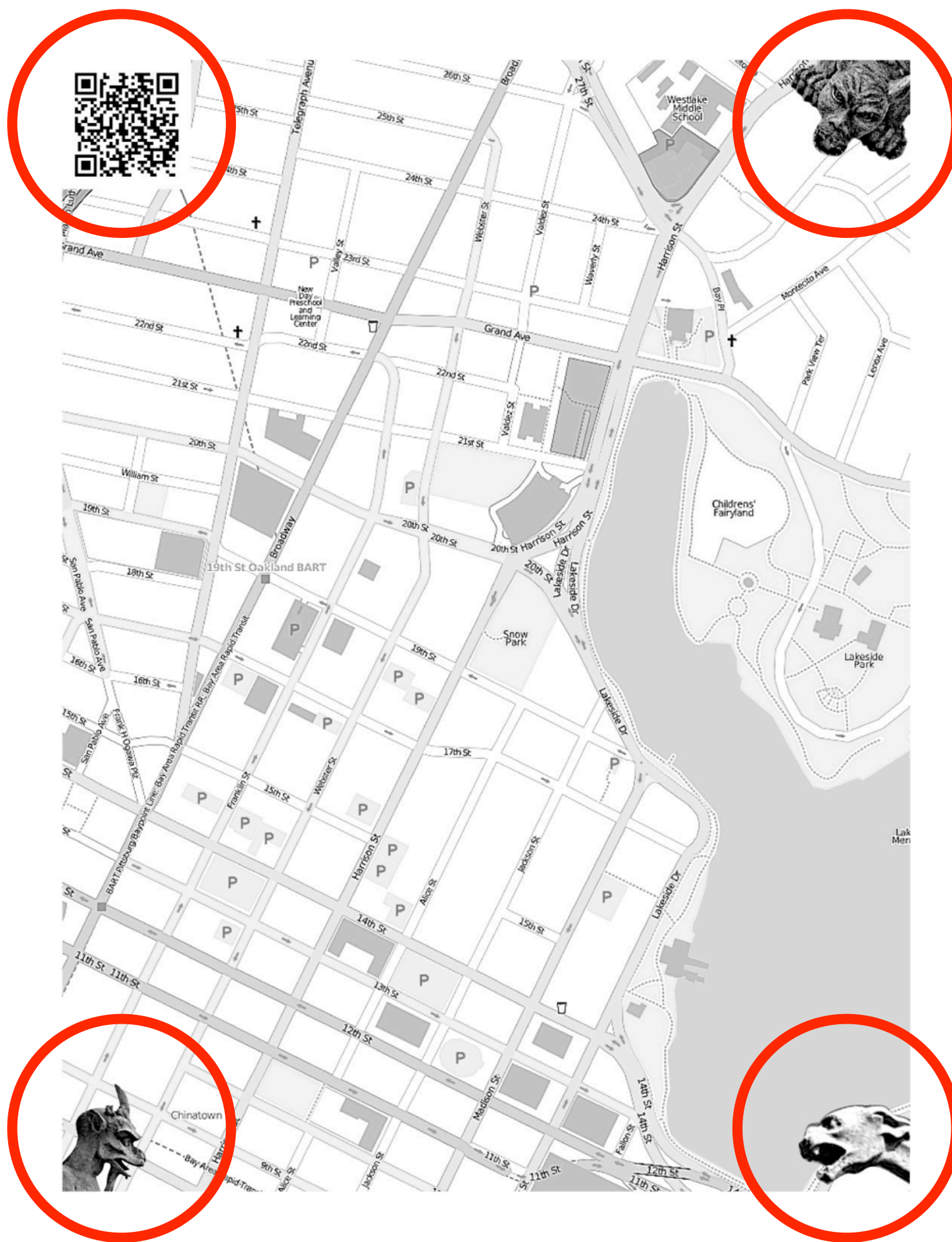
SIFT

http://teczno.com/s/kk2

Another interesting enabling technology is a computer vision algorithm called SIFT, or Scale Invariant Feature Transform.

SIFT was published by University of British Columbia's David Lowe in 1999, and it's still protected by a patent for commercial use.

SIFT makes it possible to search for "features" in an image like this gargoyle, with the idea that the same features will be found regardless of how the image is scaled or rotated.

It's possible to use SIFT and QR codes together to understand scanned images.

Here we have a bunch of gargoyles in three corners that SIFT can find.

When those three corners have been found, the QR code in the fourth corner can be found and decoded.
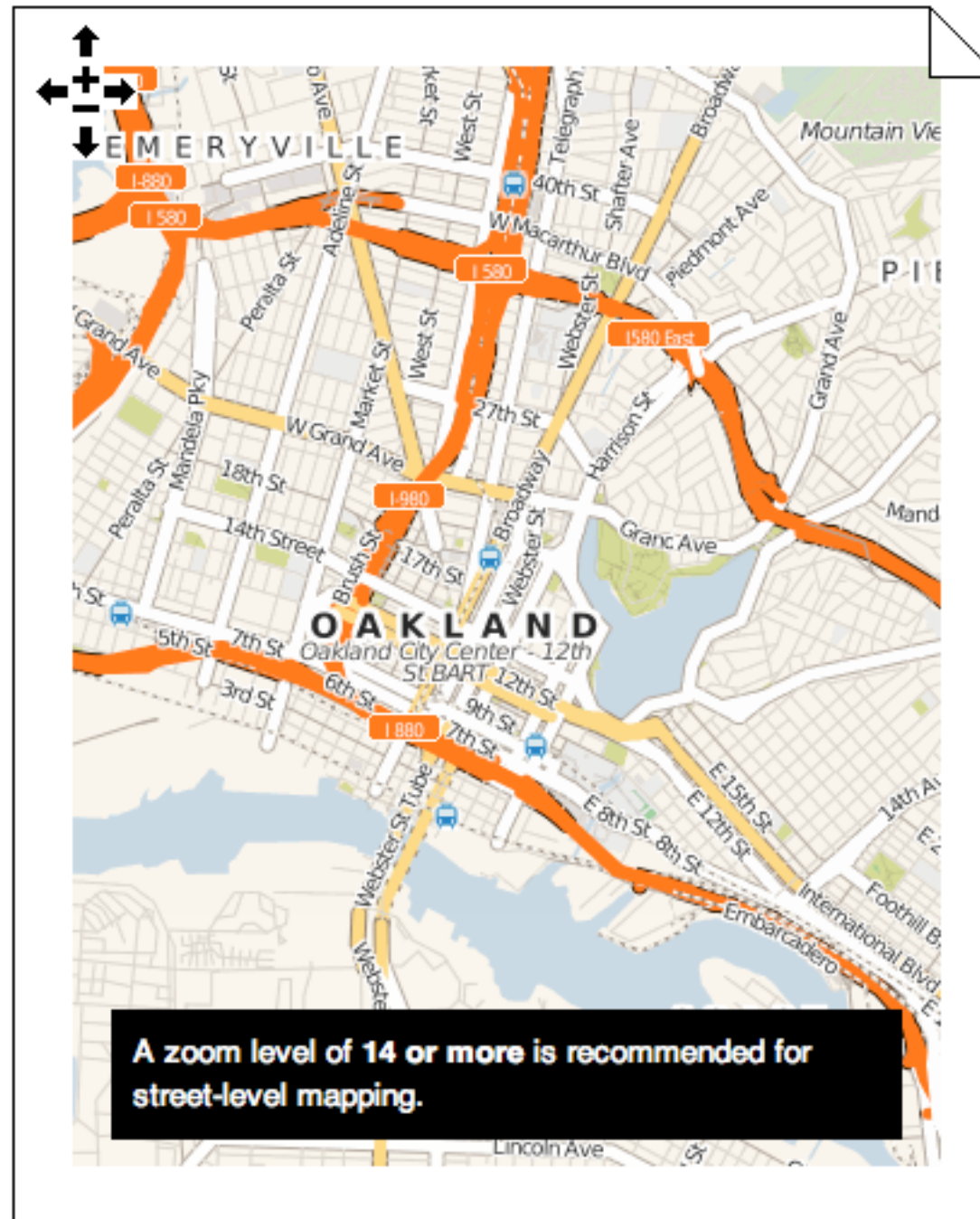
Together all these special corner images make it possible to pull very precise geographical data back out of a printed and scanned paper map.

This is just the kernel of what Walking Papers does.

Walking Papers

A zoom level of **14 or more** is recommended for street-level mapping.

Walking Papers is also a web service wrapped around that kernel.

Here we have a slippy map on the home page that lets you choose an area to print.

The black box in the bottom is telling you that you'll need to zoom in further if you want to map precise, street level details.

The frame around the map looks like a piece of paper, so you know what it's for.
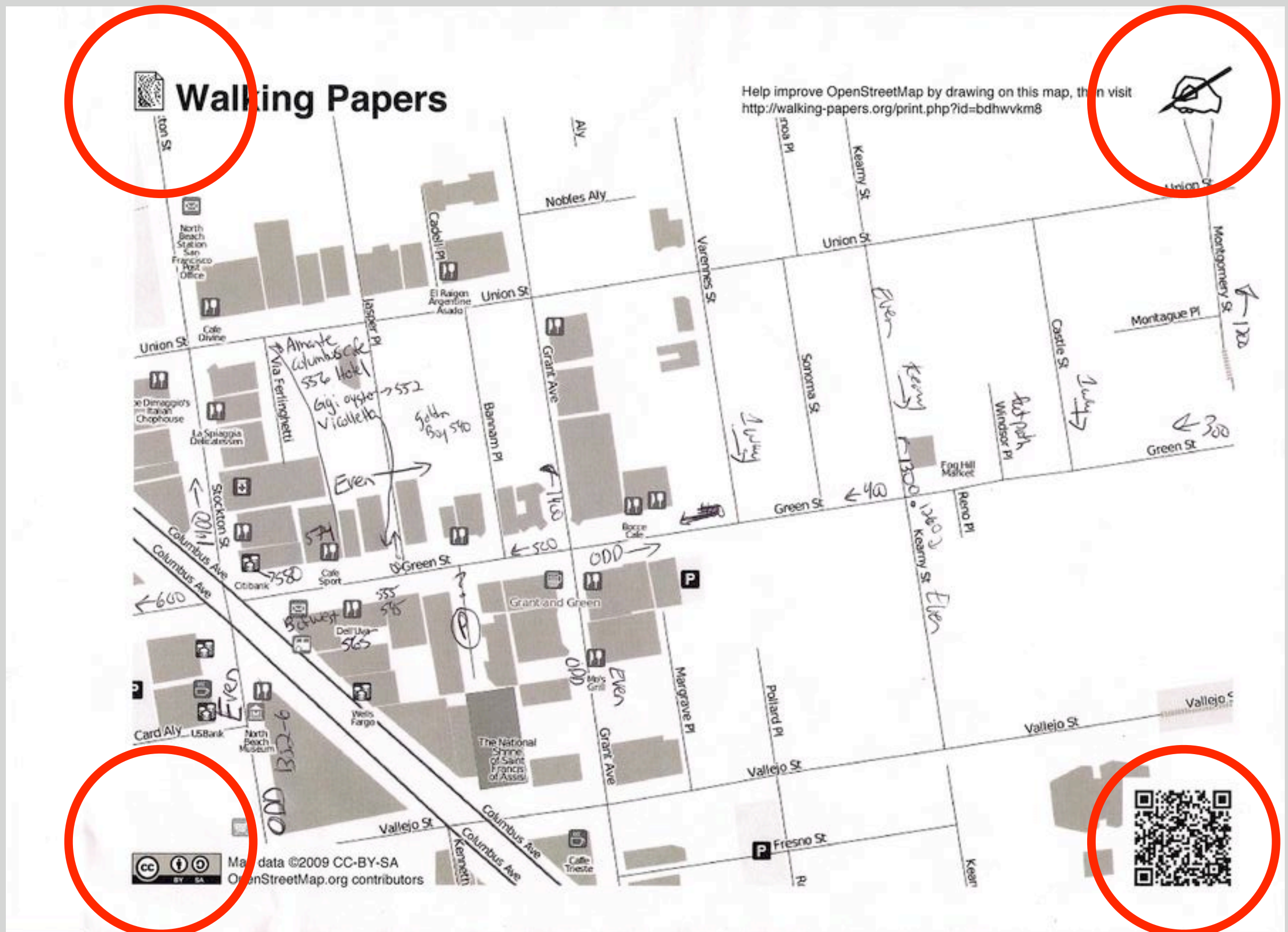
Here's a print of Chinatown, San Francisco.

Instead of gargoyles, we're using more appropriate bits of icon and text to recognize the corners.

Here you can see that someone has walked around Green Street and noted address information and a few businesses.
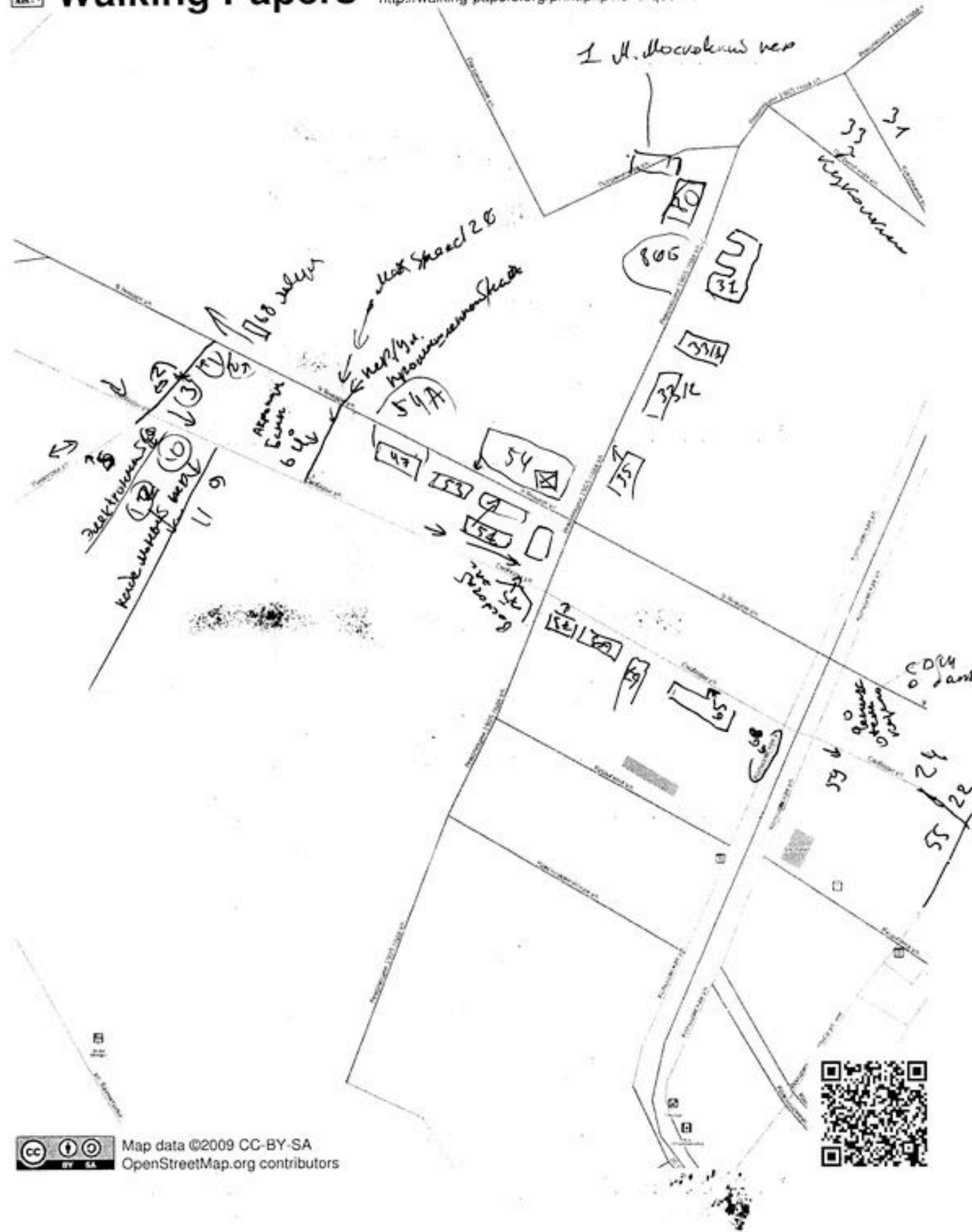
This is not information that you'd be able to get from a satellite image.

It's also information that don't really need a GPS for: the roads are already in place, but they need extra eye-level information.
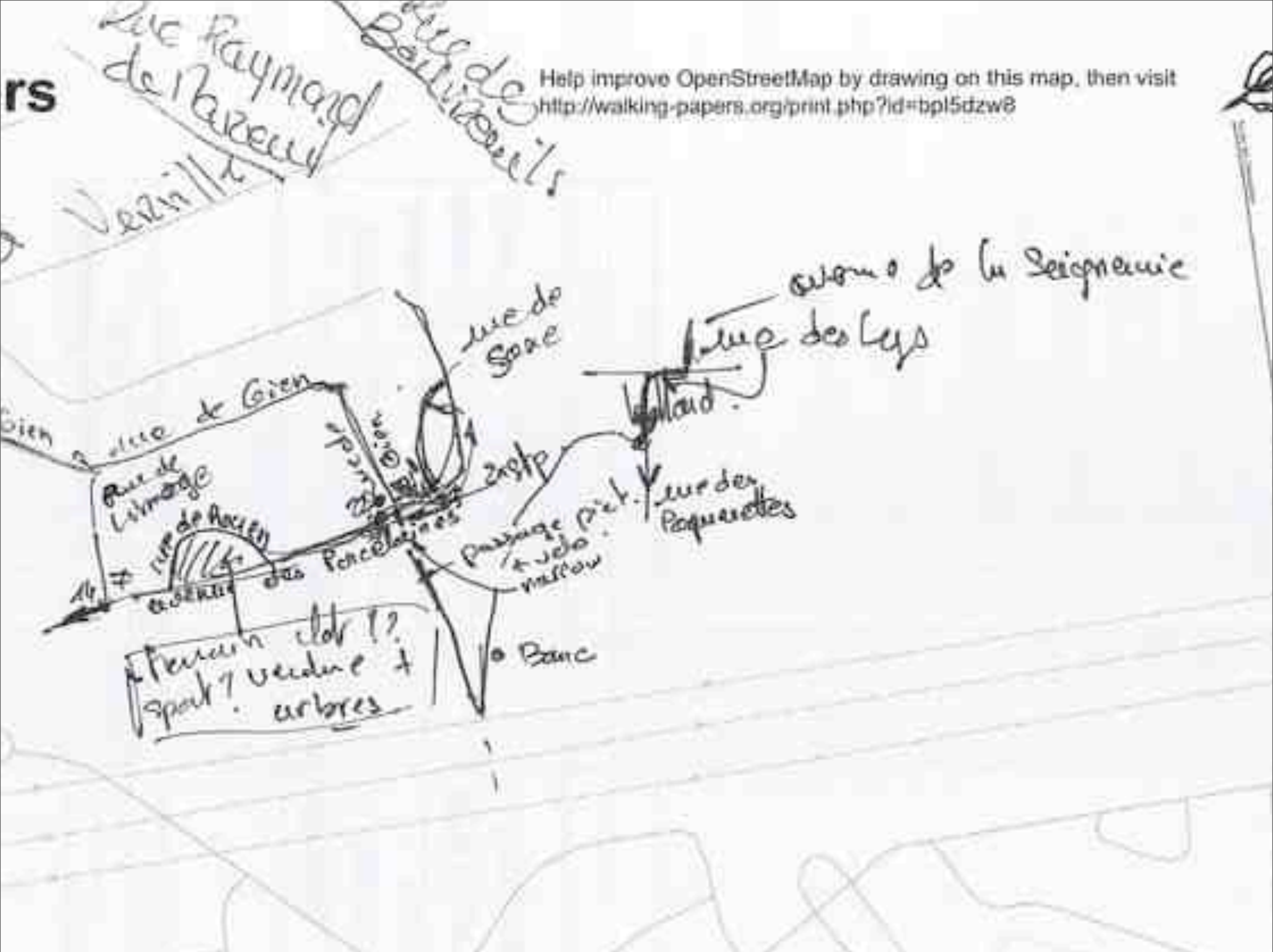
This is a print of Voronezh, in Russia.

Again we're seeing street-level information like address points and buildings added to the spaces between roads.

Here are some notes for Mennecy, France.

I think there are some new streets marked here, as well as a bunch of text with question marks.

Potlatch and JOSM don't support asking questions, but this informal handwriting does.

These are notes that I took in Oakland, California, during a recent OSM mapping party.

Please excuse my terrible handwriting.

These are very precise address points in Fradley, England.

All of the data I've seen come through Walking Papers has been like this: things you can't see from the air, in places where you don't need a GPS unit.
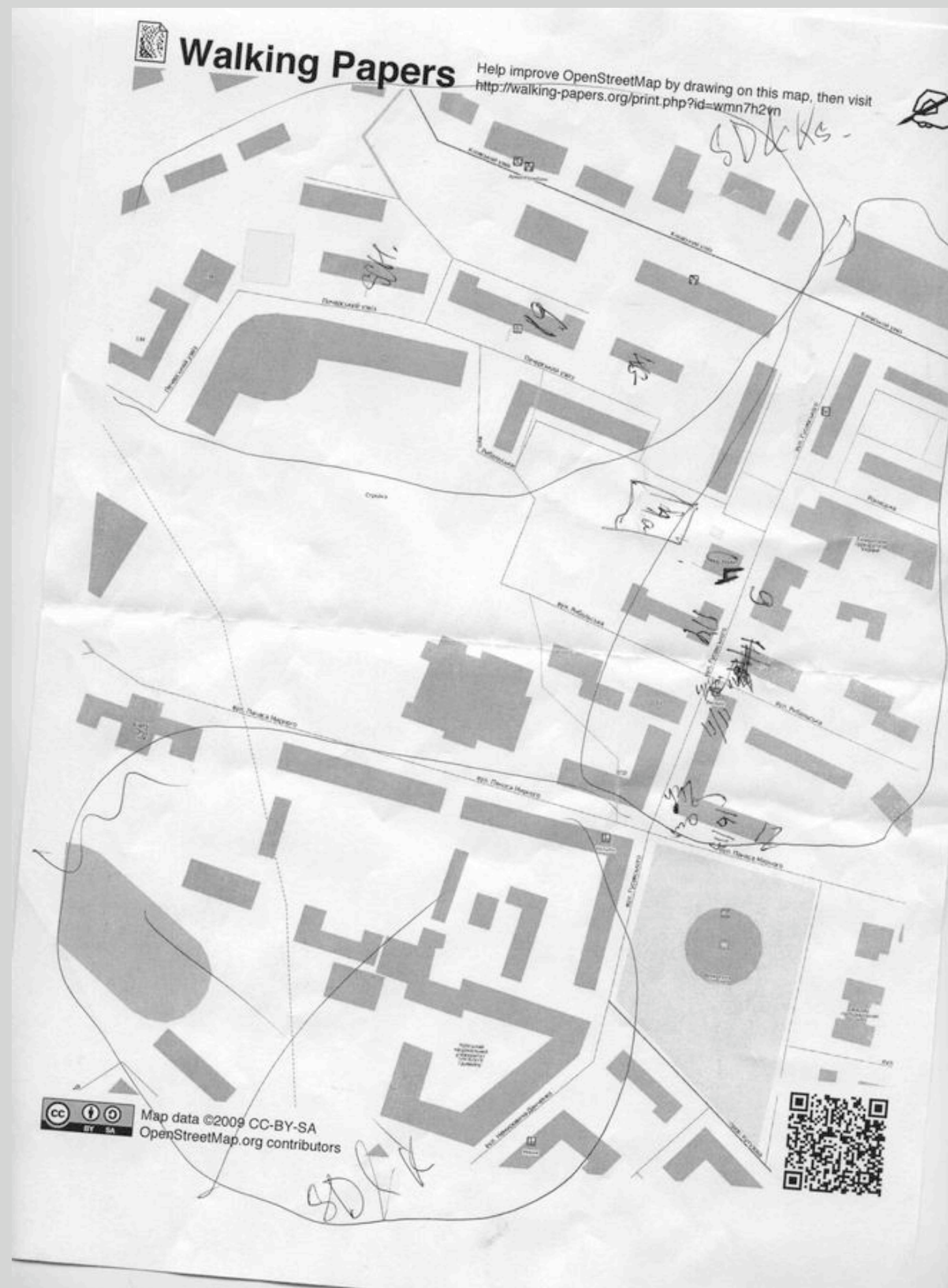
This is a scan of Kiev, Ukraine.

You can see that the mapper scanned it at a bit of an angle, which is true for a lot of the scans we see.

They're often upside-down or sideways, but the SIFT algorithm can handle these situations.
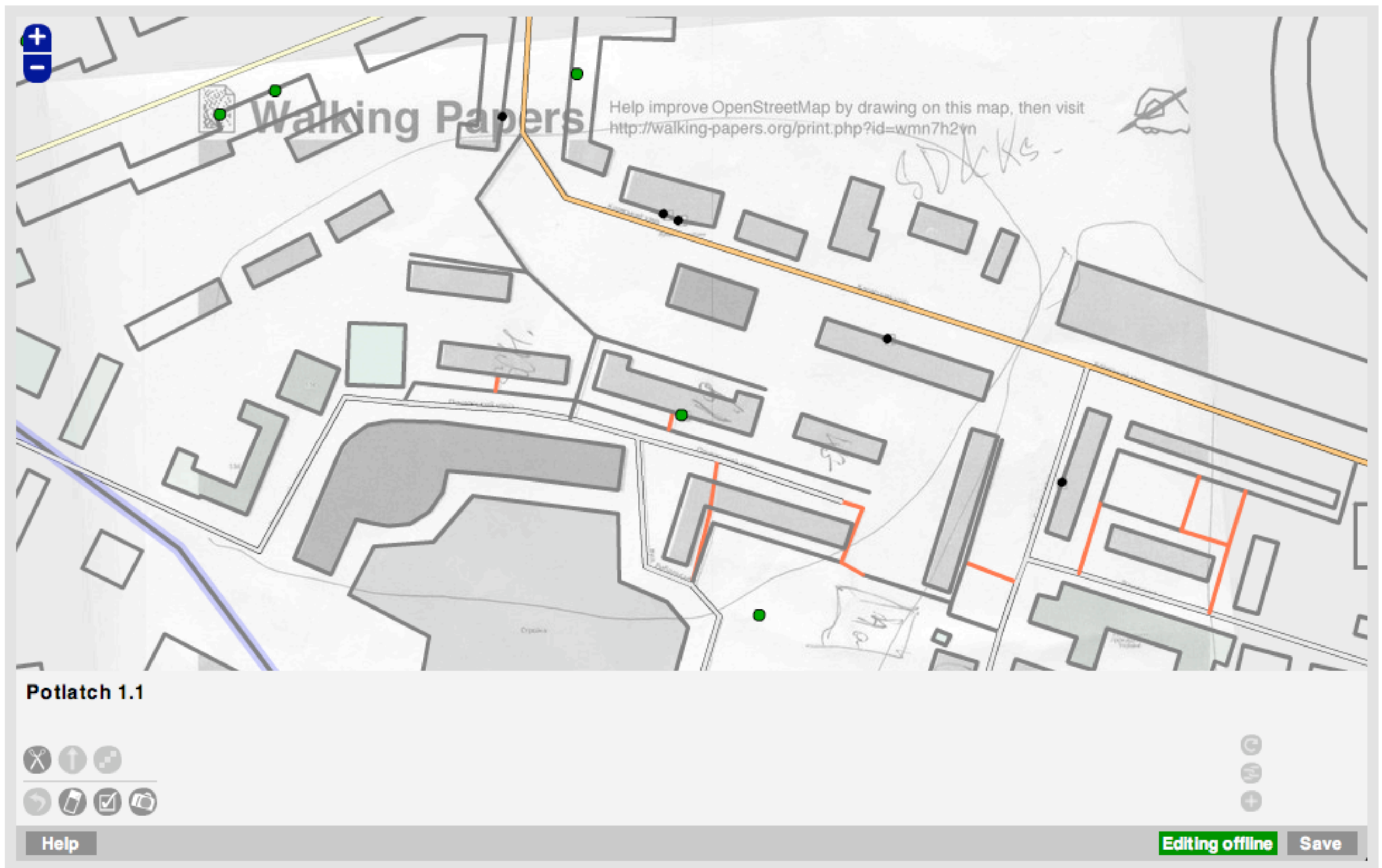
This is that same map of Kiev in Potlatch with OSM vector data overlaid for editing.

You can see that the tilted image has been rotated back to the orientation expected by Potlatch.
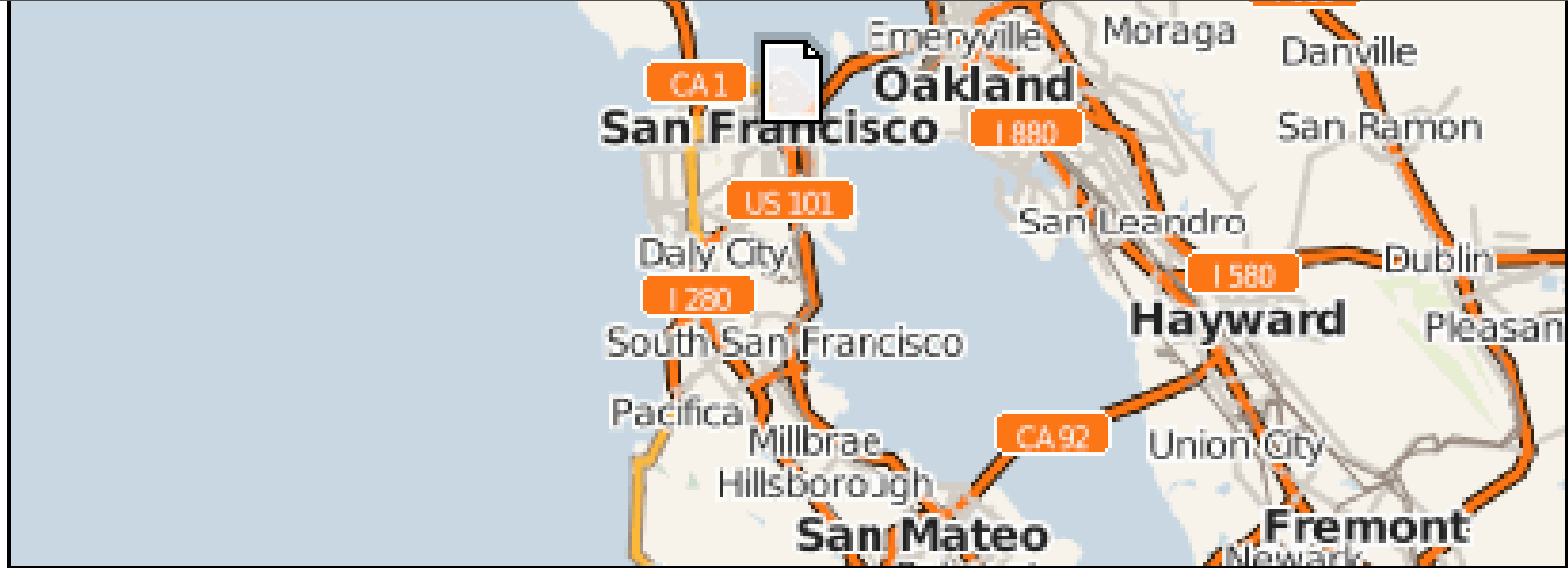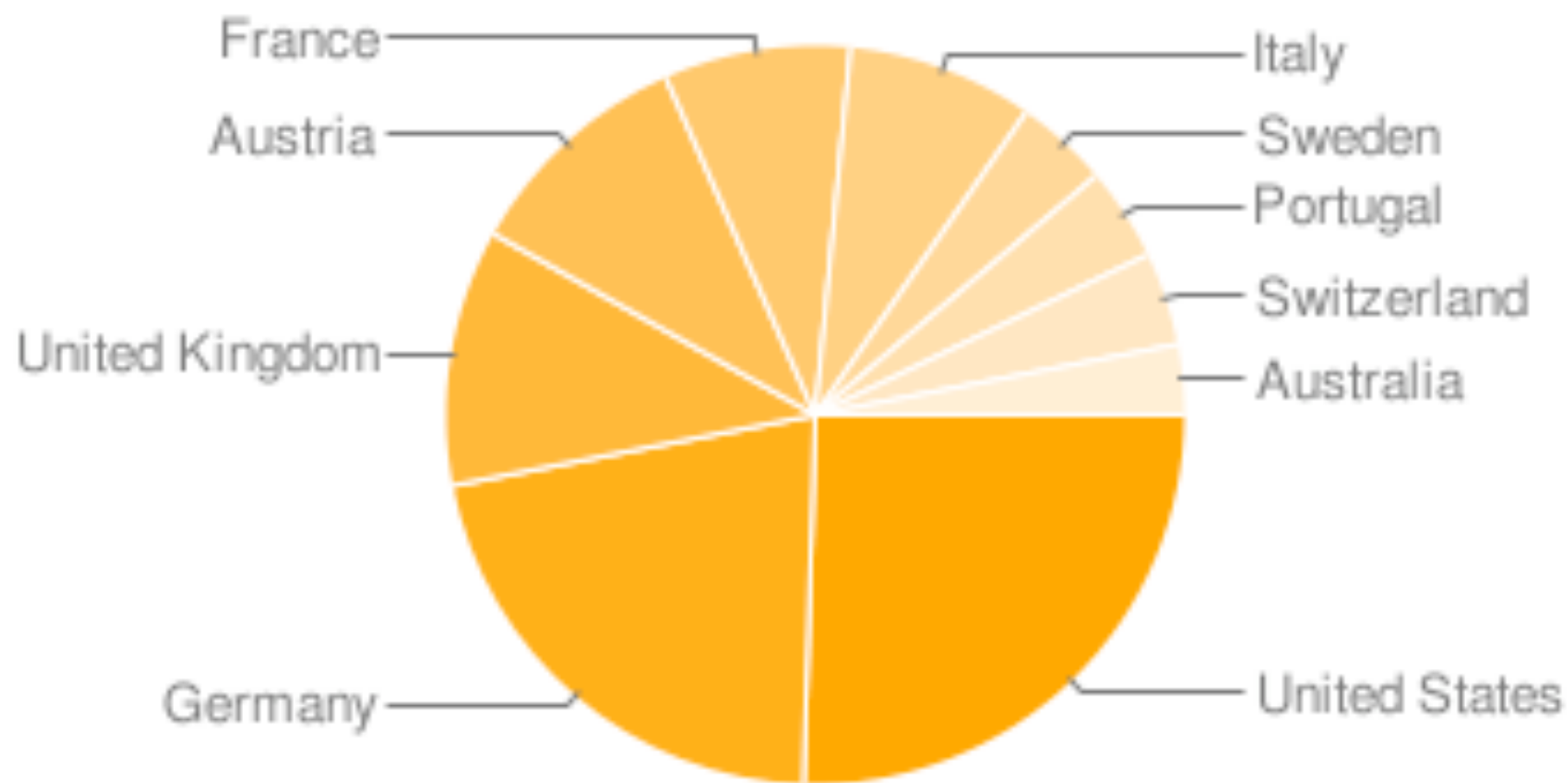
If you don't have a printer, send us a **self-addressed, stamped envelope** with the print ID, "qt46I4x4", and we'll mail you a printed copy of this map. If you don't have a scanner, mail us your printed map and an **e-mail address** and we'll scan it for you.

Walking Papers
c/o Stamen Design
3012 16th St. #200
San Francisco, CA 94103

Please allow a few weeks for scanning and printing.

I wasn't sure how many people out there had scanners or printers, since I didn't have either at home.

This is a perfectly valid offer to work with Walking Papers by mail, but so far no one has taken me up on it.

France — Italy
Austria — Sweden
Portugal
United Kingdom — Switzerland
Australia
Germany — United States

http://walking-papers.org/zeitgeist.php

I've been pleasantly surprised by the use of Walking Papers around the world.

The vast majority of activity on the site is just printing maps, not yet scanning them.

The top two countries printing maps are Germany and the United States, for 50% of the total.

The next 25% is made up of the UK, Austria, and France.

"Interestingly another project … also shunned electronic means of data collecting 'on the ground' for paper printouts which they gave to their field teams because they found that it was just quicker all round."

—James Rutter, Surrey Heath Borough Council

I think we stumbled into something more valuable than I first expected, based on some of the things James Rutter from the Surrey Heath Borough Council showed yesterday.

Two Last Things:

1. JOSM: seriously, wtf? Help wanted!
2. http://github.com/migurski/paperwalking

I still really need someone's help bridging the gap to JOSM.

You can check out the complete source code on Github if you're interested in helping or running your own copy of Walking Papers.

Most of all, I hope you choose to use it to casually map the places you know best.

Thank You

http://walking-papers.org
http://mike.teczno.com
http://stamen.com

photo by Fred, http://teczno.com/s/z70