# Exploring the Sick Traveler Map

Visualizing such a map is an effective way to better understand the big picture of this disease's spread. All the lines simply represent a connection between two places on earth: A place where COVID-19 was already spreading between people (the white end of the line), and a place where it would soon be spreading, if it wasn't already (the red end). For an example of what we can better understand by viewing this map, I've zoomed in here on China for the week of 12-19 January. This was before people knew that Wuhan would be locked down for 2 months. It's possible that most of these travelers hadn't the slightest notion that they had COVID-19, which had only been identified Jan.7, and was still assumed to have spread only from the wild animals in Wuhan's market to the people that were there. If you click on any of the news links in the tooltips that pop up when you hover on a travel segment, you'll see that there was a universal assumption that the virus was contained, that the sick person had done everything humanly possible to avoid contact with anybody, that all the people who possibly had contact with the patient had been tracked down and had all tested negative, that there was doubt as to whether the disease was even transmissible between humans, that all government health institutions had a well-designed plan to deal with exactly this type of situation, that the plan was being followed perfectly, and so on.

The 3 lines exiting the left of the screen go to Munich (from Shanghai), to Paris, and to Rome. The 2 on the right go to Seattle and Chicago. The 2 on the bottom go to Melbourne (from Guangzhou) and to Sydney. There are travelers to Sri Lanka, Thailand, Singapore, Vietnam, Malaysia, South Korea, and Japan. South Korea is even getting exposed from 3 different countries, Thailand, Japan, and China, on one single day, 19 January. The traveler from Wuhan to South Korea was actually stopped at the Incheon Airport and immediately quarantined, due to having a fever. I only included her because anyone she'd come in contact with till that point, whether in Wuhan, at either airport, or on the plane, was potentially infected but not quarantined. As for all the other travelers mentioned here, none claimed to have symptoms. But note that the only reason the Wuhan-Incheon traveler is listed as symptomatic in this dataset is because she was stopped at the airport. I'm not implying that she or any of the others were trying to hide their disease, but if you take ibuprofen and don't get diagnosed by a doctor or stopped by effective disease control at an airport, you don't know anything and can't be hiding anything. And when you're being questioned at the hospital later, and not sure whether your symptoms appeared before or after you arrived at your destination, you probably lean towards "after". It's just human nature.
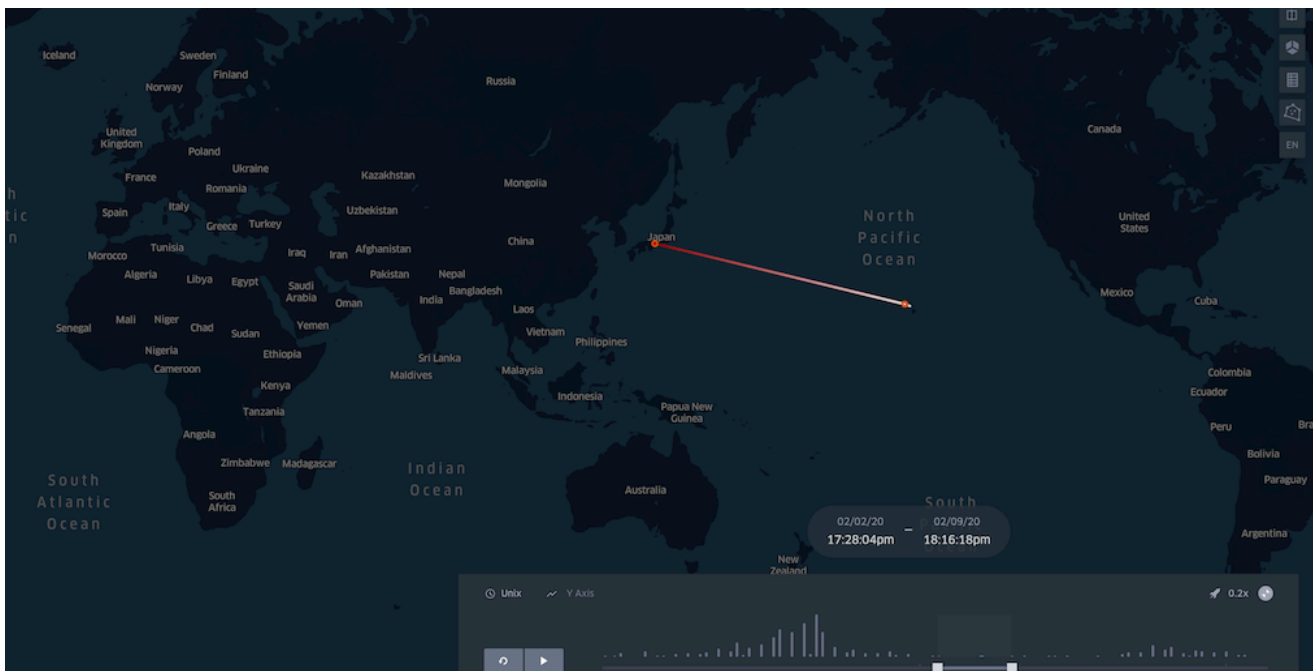
During the period 3 weeks later, from 2-9 February, the only sick travelers in the entire world are people returning to Tokyo from Hawaii. Of course there were sick people moving around the world during that week, but they all flew under this radar. China had mostly sealed off Wuhan and surrounding towns, Italy and the U.S. had stopped flights

from China, and the cases that were spreading were doing so at a local, and usually untraceable, scale. Another important point worth mentioning here is that these data only exist because someone painstakingly gathered and published them. If a country like Italy or the U.S., who received sick travelers 2 weeks before this map, doesn't want to drill down on the details of how the virus spread from those people, or doesn't want to publicly announce it, there will be no data. It's one of the great ironies of this pandemic, that many countries who pride themselves on being transparent and medically advanced refuse to publish any detailed information about a patient's travel history, while other countries with controlled, censored media actually interrogate their patients and release the data to the world. If anyone wants to get a clear sense of this phenomenon, I encourage them to try googling for consistent information on how the virus first spread in Italy.
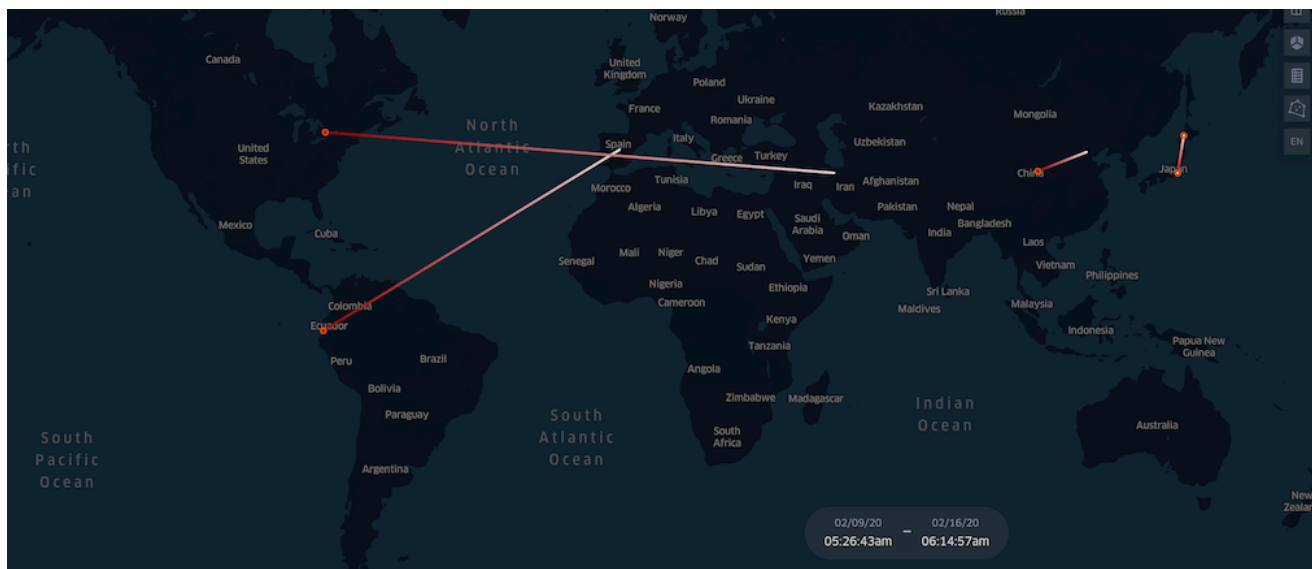
Still quiet the following week: Madrid flying to Ecuador and Tehran to Toronto, as far as international travel. The source (white) ends of the lines are indications of where the next outbreaks are flaring up.

This is the week 10 days after the week in the last snapshot. Europe, and mostly Northern Italy, is now sending sick travelers to every continent. Iran is also a hotspot, to a lesser extent. It appears as though within a few weeks, North and South America (especially the U.S.) and also on a smaller scale Africa, will be dealing with outbreaks.

Here's the link to the map:
https://kepler.gl/demo/map?mapUrl=https://dl.dropboxusercontent.com/s/q3e7szdombqtazx/keplergl_jooq42l.json

Or the link to a notebook showing how to use the same map:
https://nbviewer.jupyter.org/github/ebhtra/springboard/blob/master/capstone_2/Kepler_Map_Display.ipynb