

HISTORICAL GIS RESEARCH IN CANADA

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ISBN 978-1-55238-756-6

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The Irony of Discrimination: Mapping Historical Migration Using Chinese Head Tax Data

Sally Hermansen and Henry Yu

For over a century, from the late nineteenth through the late twentieth century, Chinese migrants to North America were the targets of racial discrimination and immigration exclusion and control. As targets of government surveillance, Chinese migrants were usually detained before being allowed to pass borders. They were forced to give details about their origins and destinations and to be physically described and measured. Chinese were given identification papers and tracked in government data sets long before other migrants came under the same regime of documentation. In comparison, European migrants passed through ports into Canada and the United States with relative ease, leaving much less paperwork. It is a great irony of the history of migration to North America that Chinese migrants – those who were most unwelcome – have given historians more detailed government data than the more readily welcomed trans-Atlantic migrants from Europe.

In 2004, this ironic consequence made the Chinese Migration Project possible. In 1885, the Canadian government imposed a \$50 head tax on all Chinese entering Canada. A substantial proportion of a year's wages as a labourer, the head tax had been deliberately designed by the British Columbia provincial government and the Canadian federal government to discourage Chinese migration.¹ After imposing the head tax in 1885, the federal government created a detailed register that tracked not only who had paid but also a variety of other details such as age, height, village

of birth, county of birth, last place of residence, occupation, port of origin, place and date of arrival and registration, and ship's name.

These data, and particularly the data documenting registrants' height, caught the interest of Peter Ward, a historian of health at the University of British Columbia (UBC). Because the 97,123 registrants were spread out over half a century, Ward believed that statistically analyzing their heights could provide a health measure reflecting the effects of changing childhood diets in China. A conversation with UBC colleague Henry Yu, a specialist in Chinese migration history, led to a SSHRC grant to create a digital database of each of the nineteen columns of information for each of the Chinese migrants. Yu was particularly interested in the geographical data. Beginning in 1910, the register began recording the migrant's destination in Canada – in addition to their geographic origins in China – creating the possibility for a detailed analysis of both origin and destinations for over a third of the migrants (35,731 between 1910 and 1923).

The SSHRC project involved a team of student researchers spending almost two years in laborious data entry, deciphering the often difficult-to-read handwriting of the register line by line. Led by Dr. Feng Zhang, then a doctoral candidate in sociology, the research team of Jason Chan, Mary Chan, Judy Maxwell, Alyssa Pultz, Denise Wong, and Lucy Lihong Zhang performed an amazing feat of alchemy, transforming over four thousand microfilm images of the original pages of the Head Tax Register – each with roughly twenty-five lines and twenty columns of handwritten data – into an enormously detailed digital database with nearly three million individual entries of data. This was no mean feat, since the longhand

cursive writing was painstaking to read and decipher.

In 2009, the resulting database was featured on the Library and Archives Canada website with a streamlined search function for genealogical purposes.² In 2012, a fully searchable database with access to all of the original columns of data was made publicly available through a joint UBC and *Simon Fraser University* Library project.³ The main use of these databases has been for genealogical purposes, and so one of the first yields of the hard (almost blinding) work of the research team was a valuable public history resource that allows descendants of the nearly 100,000 Chinese migrants who came to Canada in the late nineteenth and early twentieth century to search electronically for their ancestors. Rather than having to pore through the same difficult-to-decipher microfilm images of cursive handwriting that the research team used, family history researchers can now find their relatives with the ease of typing a name into their computer at home.

There was much more of value in the newly created database, however. One of the first research analyses applied to the database utilized the detailed height of each migrant. Ward used statistical analysis techniques to find that there had indeed been a steady and significant rise in average height for the Chinese migrants over the period. These increases, he hypothesized, resulted from improvements in diet that were themselves the result of financial remittances from the very migrants captured in the database. The economic effects of the earlier generations of migrants on those who followed from the same villages were significant, not only in terms of better food and housing but also in inspiring aspirations for wealth that created generation after generation of chain migration.⁴

GENERAL REGISTER OF											CHINESE IMMIGRATION									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
REG. NO.	NAME	DATE OF BIRTH	DATE OF ARRIVAL	PLACE OF BIRTH	SEX	AGE	STATUS	PLACE OF RESIDENCE	PLACE OF ORIGIN	PLACE OF DEPARTURE	PLACE OF ARRIVAL	DATE OF ARRIVAL	PLACE OF ARRIVAL	DATE OF ARRIVAL	PLACE OF ARRIVAL	DATE OF ARRIVAL	PLACE OF ARRIVAL	DATE OF ARRIVAL		
98801	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		
98802	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		
98803	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		
98804	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		
98805	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		
98806	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		
98807	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		
98808	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		
98809	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		
98810	Lee Ah Lay (Ho Lin Lu)	April 7	91718	69415	500	Male	10	Lee Ah Lay Hong Kong	China	School boy	Lee Ah Lay	June 15	Quebec	1882	China	1882	Quebec	1882		

Fig. 11.1 Sample page from General Register of Chinese Immigration. (Source: Library and Archives Canada Website: <http://www.collectionscanada.gc.ca/chinese-canadians/021022-1000-e.html>. Government of Canada text on *The Early Chinese Canadians 1858-1947* Website © Government of Canada. Reproduced with the permission of the Minister of Public Works and Government Services Canada [2011].)

It was this “imagined geography” of aspirations through mobility that we hoped to capture through applying GIS methods to the database. Worldwide, roughly 100 million people outside of China are descended from ethnic Chinese migrants who left China over the last five centuries, and the vast majority of them came from just two southern coastal provinces – Guangdong and Fujian. Within those two provinces, villages in a handful of counties were the main sending regions for century after century of continual out-migrations that created elaborate communication and transportation networks

connecting these regions to an array of destinations around the globe. Beginning with short distance networks and then expanding to southeast Asia and around the Pacific, by the late nineteenth and early twentieth century, migrants were establishing and following circuits that took them as far as Africa and South America. These networks were generally circular in nature, with ideas, trade goods, and people moving in multiple directions and with complex and constantly adjusting flows.

Eight particular counties in Guangdong province dominated Chinese migrations to

Canada, the United States, Australia, and New Zealand. Beginning with the “gold rushes” to California and up and down the North American coast in 1849, and continuing around the other side of the Pacific to the Australian colonies of the British, migrants fuelled their journeys with dreams of gold. Even after the gold rushes diminished, aspirations for wealth continued as the organizing metaphor for migration. Leaving for North America, Australia, or New Zealand was called, in the Cantonese dialects that the migrants spoke, going to “Gum San” – literally Gold Mountain (金山). “Gold Mountain” was not the name of a specific place (the Cantonese had separate terms for “Canada,” the “United States,” and “Australia”). Rather, it named an imagined geography created by a life cycle of aspiration involving mobility and long distance linkages. Stories of wealth came to young children from men overseas or recently returned, creating desires within younger men to follow the same paths. Loans and other forms of support in finding jobs and housing smoothed the journeys, and those already established made money by organizing labour contracts for newcomers, or selling shares in businesses and ventures they had established overseas.

“Gold Mountain dreaming” involved imagining a lifetime ahead inspired by exemplary tales passed back to rural villages from far overseas. The life cycle idealized working hard and saving towards marriage – perhaps an arranged marriage to a woman back in the village who would raise children and take care of the household, or to a woman in “Gold Mountain” whose connections to local communities could help in establishing a business – and the education of children for eventual success. The dispersion of the local sites for this life cycle

– small villages in China, seaports and migration nodes such as Hong Kong, Singapore, San Francisco, Sydney, Honolulu, Victoria, and Vancouver, and rural and urban spaces all around the Pacific and the Caribbean – meant that geographically split families were common, with women and children on one side of the ocean and mobile men in sites around the world. Remittances built houses, hospitals, and schools in home villages, but there were also investments in businesses and education in North America and other local sites. An economics of relative location developed out of the continual calculus of wages, prices, and the comparative currency values for labour, goods, and services in multiple locations. What to trade, when to move, and where to go – all were a product of the powerful geographic imaginary created by “Gold Mountain” dreams.

What Yu hoped to gain from an analysis of the General Register of Chinese Immigration to Canada was a detailed yet aggregate interpretation of the patterns of flow and geographic networks of these almost 100,000 migrants. Moving beyond the “head tax” and other discriminatory anti-Chinese acts as the main historiographic issue that made Chinese in Canada interesting to historians, the goal was to understand what Chinese Canadians were themselves doing rather than only what was done to them. If the detailed surveillance of Chinese migrants provided the raw material for re-imagining the role of Chinese Canadians in Canada’s history, there was an elegance and poignancy to bringing a new life to the dead data scribbled in the longhand of the clerks of Canadian racism.

Once the head tax database was complete, the question was whether we could use it to help map this geographic imaginary. Historians are

adept at creating narratives of change and continuity over time; most are also familiar with the basics of working with spreadsheets, databases, and statistical software, and the challenges of visualizing numeric data in graphs. The initial research team on this project used these skills to produce graphs of the immigration data. By plotting numbers against arrival dates, they were able to see the peaks and troughs of immigration and how it mimicked federal immigration policy and legislation. But to create a map of the destination cities or a map of the counties in China from which the immigrants came, or to visualize links between origin cities in China and destinations cities in Canada over time – thus visualizing the historical process of chain migration – went far beyond tinkering with Excel or SPSS.

The need for more powerful tools to analyze the data and to create maps and other visualization brought Henry Yu to the UBC geography department, and to GIS specialist Sally Hermansen. Hermansen was teaching an upper-division undergraduate-level geo-visualization class and recognized that this incredibly rich database would be perfect for a student group project. Hermansen's students created a subset of the overall dataset focussing on origins and destinations. Because destination data was only available for migrants after 1910, Hermansen and her students decided to refine the 97,123 records down to only those between the years 1910 and 1923 (when Chinese exclusion laws essentially cut off further migration), resulting in 38,410 individuals. These records were further refined to include only those that contained destination information (35,731).

The destination data had been transcribed from handwritten entries for those migrants who landed at the port with known destinations.

Mistakes had been made in the original registering of the destinations, as well as in the coding of this data into the digital database. For example, there were often two or more variants in spelling of the same place name. After a process of analysis and data cleaning, a unique destination list of 522 place names was created to cross-reference with the current DMTI Spatial Inc.(a geospatial data provider) Canadian place name database. When the unique destination table was matched to the place name spatial file with the GIS software, 150 of the destination names did not match, many the result of spelling variants. When the spelling variants were corrected, only thirty-six destinations remained unmatched. The final database of immigrants contained 35,680 records in 460 unique destination cities and towns in Canada. In summary, after cleaning up the data, there was a remarkable 99 per cent match of the destination city of Chinese immigrants between 1910 and 1923 to current place names of cities and towns.

Combining Yu's research expertise in the history of Chinese migration with Hermansen skills as a GIS researcher allowed us to produce some initial maps of origin and/or destination over various time frames. A variety of Canadian destination maps were created by relating the database of Chinese immigration data to the place name GIS layer. Once the data had been related, any number of maps could be created. The simplest, and possibly most visually effective, map created was a simple dot map plotting all 460 unique destinations.

This map revealed instantly the vast expanse of Canadian geographic space to which Chinese immigrants moved – their destinations were by no means constrained to the obvious port cities of Vancouver, Victoria,

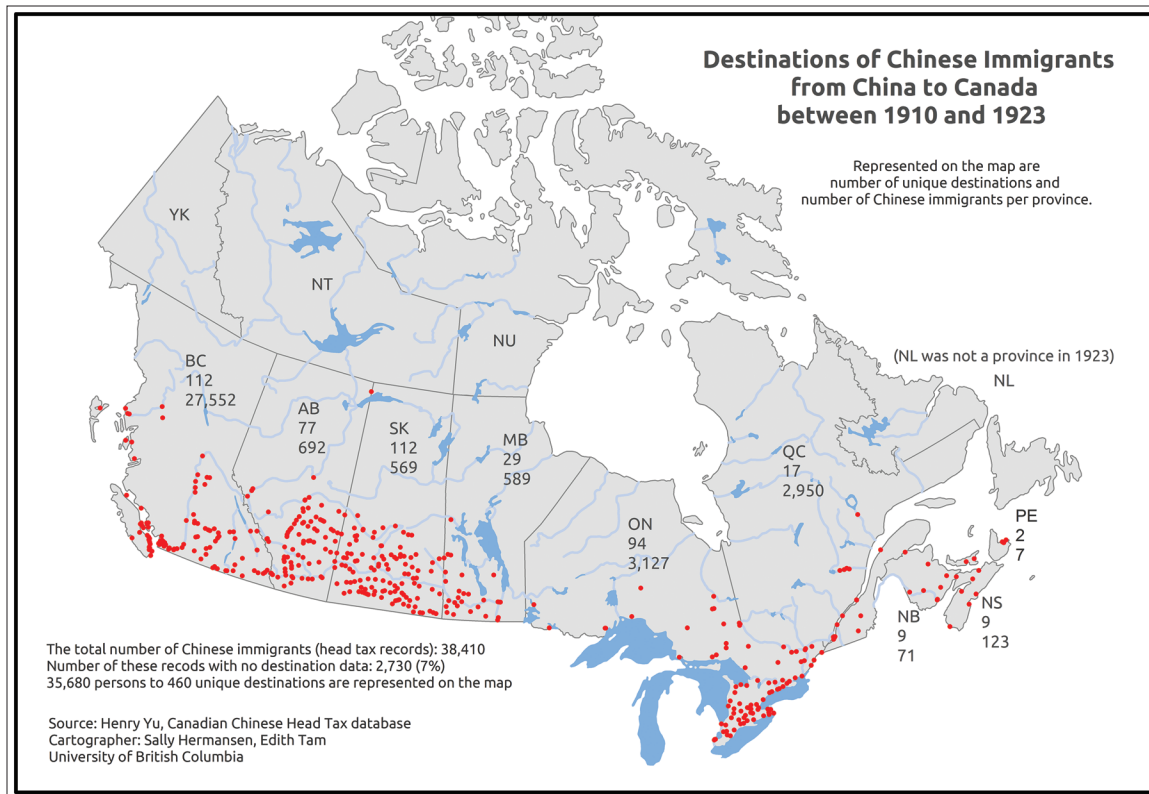


Fig. 11.2. Unique destinations of Chinese immigrants between 1910 and 1923.

and Montreal. (Newfoundland was not part of Canada at the time of this immigration, so there were no cases of Chinese immigrants who recorded Newfoundland as their destination in the General Register, although Newfoundland had its own head tax of \$300 enacted in 1906 and a registry database of Chinese immigrants has been created by Dr. Miriam Wright of the University of Windsor.) There were also no recorded immigrants in the Northwest Territories or Yukon, but every other province had recorded destinations. We then created a proportional symbol map of destination cities, where the size of the dot was proportional to the number of immigrants who went to that destination. Subsequent choropleth maps were

also created where the destination data were aggregated by province.

For the creation of the China origin maps, the immigration head tax database contained three origin variables or three levels of origin resolution: province, county, and village or town. Of the 36,000 records at the province level, almost all the immigrants came from one province: Guangdong. Only six came from four other surrounding provinces; 155 came from outside of China; and 850 records were 'unknown.' A choropleth map was created of the provincial origin data by digitizing an 1820 provincial boundary map of China. Drilling down to the county level, the data are mapped to 1911 county boundaries, thereby creating a

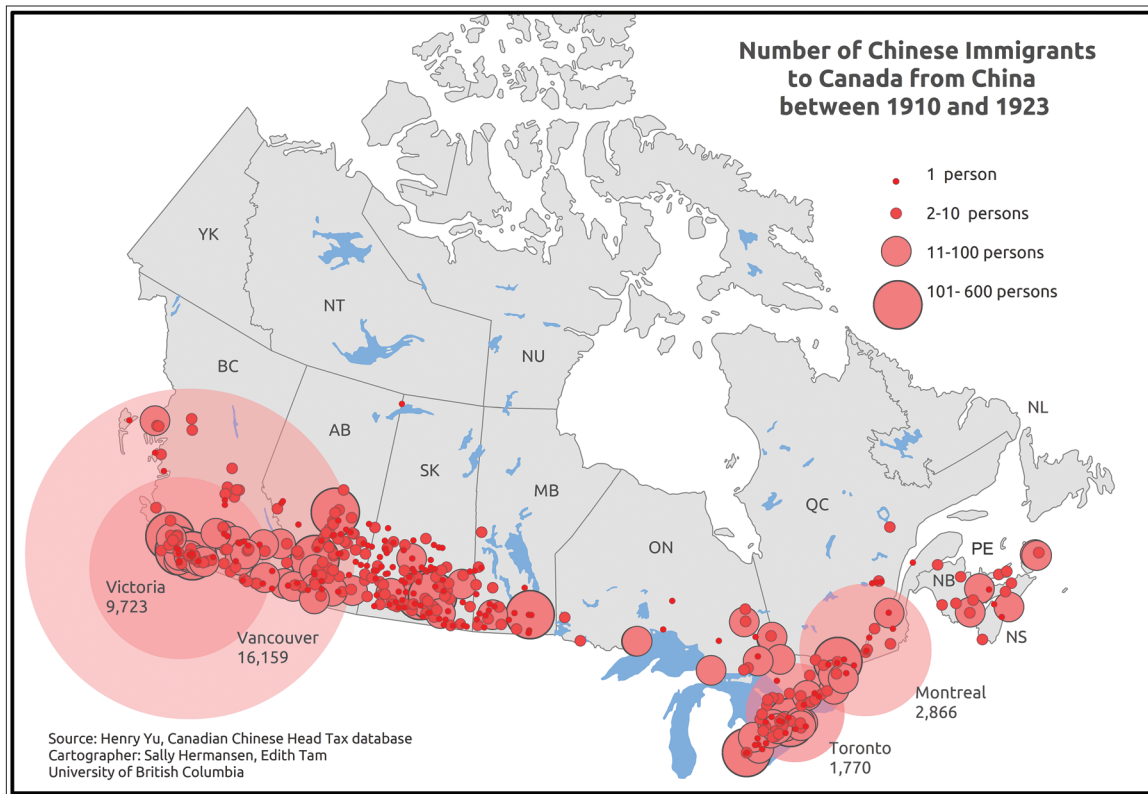


Fig. 11.3. Number of immigrants per destination between 1910 and 1923.

choropleth map of origin data by county. Drilling down further to village and town proved impossible for this initial project because the data contained too many variations in the phonetic transliteration of Chinese village names into English, and detailed GPS coordinates of Chinese villages were unavailable.

The GIS team continued to create maps that explored the relationship between origins and destinations in Canada, as well as other fields of the database. For example, on an origin county choropleth map, pie charts were created of the destination region in Canada. Further maps were created of different time frames in order to depict temporal patterns of migration, in particular highlighting the

effects of anti-Chinese legislation on the numbers of migrants, as well as periods of war and economic depression.

Like all historical GIS projects, the maps and other resultant visuals greatly facilitate narrative explanations about the historical process of trans-Pacific Chinese chain migration. They also do far more. They engage the reader visually, sparking and enhancing spatial perspectives that otherwise might be muted by linear narratives of change and continuity. In doing so, they informed research in a generative manner, leading to other questions that without the visuals may not have become apparent (or were not thought possible). For instance, after the class project was finished and the power of

the maps for visualizing the spatial distribution of Chinese Canadian migrants was realized, it became immediately apparent that a project to regularize the English transliterations of Chinese village names and to match them to the actual villages in China might be worth the effort because of the potential to correlate migration patterns between geographic locations on both sides of the Pacific.

One of the students, Edith Tam, began working on a project led by Eleanor Yuen and Phoebe Chow of UBC's Asian Library to map the Chinese villages in the head tax database. Because historical records were of limited use for understanding the specific ways in which migrants speaking highly variant dialects of Cantonese would pronounce their village names, Yuen and Chow devised an important methodological innovation. They engaged with a number of elders from the Chinese Canadian community who had deep familiarity with the local counties in question, as well as fluency in the local dialects, which are not only highly idiosyncratic in both vocabulary and pronunciation compared to both Cantonese and Mandarin, but often unintelligible to other Chinese speakers. Beginning with Hoisan, 台山 (otherwise known as Sunning, 新寧), county where 45 per cent of all migrants to Canada originated, and then moving on to Heungsan, 香山 (later renamed Chungshan, 中山), county near Macau, the Asian Library's mapping project went through twenty rounds of community workshops with Chinese Canadian elders, a painstaking but rewarding process.

The enormous challenge of finding the villages in Hoisan and Heungsan counties that corresponded to the wide range of English transliterations found in the database would have been impossible if the researchers had

not engaged local community elders. Over the initial two years of workshops, the phonetic transliterations of village names found in 44,131 entrants from Hoisan county and 5,898 entrants from Heungsan county were analyzed. Using their knowledge of local dialects to "reverse engineer" the original village dialect pronunciation that the English-speaking clerks must have heard, and then matching this hypothesized name to an actual village, these elders were able to match the villages of over 90 per cent of the migrants from those two counties to historical village names on a 1911 map.

This remarkable feat of detective work was only possible because the living memory of these village dialects still exists among small numbers of Cantonese elders overseas. Because of Mandarin language policies and the introduction of a single national dialect in school education following the 1949 Chinese revolution, many local village dialects have fewer and fewer living speakers, and this project may well be impossible to do after another generation. After these two counties had been completed, one of the elders involved in the workshops, Rudy Chiang, undertook a third sending county, Sunwoy (新會), by himself as a labour of respect and devotion to the immigrant ancestors from that county who had paved the way for his own family.⁵

Since these three counties together accounted for over 65 per cent of all Chinese migrants to Canada between 1858 and 1923, it is now possible for a GIS project mapping origin villages to be undertaken if an accurate GPS mapping of the historic villages in these three counties can be created. Unfortunately, many of these villages no longer exist, as suburbanization and industrial development have subsumed rural areas in Guangdong province

over the last three decades, but many of the more remote villages still remain much as they were over a century ago. Historical maps give a rough idea of where many of the original villages were located, but this important project remains to be done.

Subsequently, Yu began working on another large-scale project, which aimed to create a portal website for Chinese Canadian history. The “Chinese Canadian Stories” Project,⁶ a \$1.17 million public history project between 2010 and 2012, involved collaborations between digital librarians and archivists, university researchers and students, and community members from twenty-nine local organizations across Canada. Funded by the Community Historical Recognition Program of the Ministry of Citizenship and Immigration Canada, with in-kind funding from UBC and SFU, the goal of the project was to create a range of web-accessible resources that exemplified the most current historical scholarship, as well as extensive reciprocal partnerships between community organizations and universities. The project also involved the Critical Thinking Consortium, a nation-wide non-profit network of teachers who worked with researchers at UBC to create digital learning resources that could be downloaded by teachers across the country. These resources included a digital historical learning game called “Pages from the Past” that asked social studies students to give advice, using a magical photo album, to historical Chinese Canadian characters as they made important life decisions, at the same time learning about the building of Canada by immigrants in the early twentieth century.⁷

The Chinese Canadian Stories project was ambitious in scope, involving everything from digital oral history recordings to the creation of

digital games. The oral history stories of elders across the country were created on a specific model, involving extensive interviews that were several hours long, subsequently logged and digitally preserved by UBC Library, along with short “YouTube” videos that were edited highlights from the interviews. This formula of saving detailed interviews for posterity and future research, as well as creating professionally edited short films that were widely accessible online, came out of the imperative that community participants should be given back versions of the interviews that they could proudly (and easily) show family members and friends. Based upon a model of “photo album” interviews pioneered by the UBC research team, interviewees were encouraged to share memories by flipping through treasured photo albums, discussing meaningful photographs that were subsequently scanned at high resolution for digital preservation. Metadata for these scanned images would include information gleaned from the interviews, preserving memories even as the original photos remained as treasured heirlooms with the families. This model allowed the project to avoid the unnecessary act of alienating important family photographs from descendants, even as important stories surrounding the photos were recorded and preserved in UBC Archives. The project’s aim was to create archival collections where photographs with Chinese Canadian subjects would never again have metadata such as “Unknown Chinese, location unknown, date unknown.”

The Chinese Canadian Stories project also involved students in all aspects of its work, from the collection of oral histories to the design and construction of mobile museum kiosks that were hosted in 2012–13 in

high-traffic locations such as the Vancouver Public Library and the Ottawa Public Library. An online immersive video game called “Gold Mountain Quest,” plunging ten- to twelve-year-olds into the small town world of 1910 Canada, was created by digital design company Catstatic and master’s students at the Centre for Digital Media’s Great Northern Way Campus. “Gold Mountain Quest” used the most up-to-date historical research on the lives of Chinese Canadians in small-town Canada to populate a fictional town of a century ago. The game player helps an array of the townspeople fulfill mini-quests, at the same time collecting historical objects drawn from the over 25,000 objects in the Drs. Wallace and Madeline Chung Collection at UBC Special Collections (one of the best archival collections concerning Chinese Canadian and Canadian Pacific Railroad history).⁸ Designed as a fun yet still educational companion to the “Pages from the Past” learning game, the pair show how partnerships between research scholars, teachers, and digital media designers work best when each is involved collaboratively at every step of the way from conception through completion. Working iteratively took longer (each game took over eighteen months), but the results were worth the additional time and effort, in particular in terms of the historical accuracy and authenticity of portrayals of Chinese Canadian life.

The Chinese Canadian Stories project also produced a searchable interface for all of the columns of data within the Chinese head tax database. (The online search function at the Library and Archives Canada site only enabled searching by the name of the individual, year of arrival, or certificate number.) This more fulsome search interface allows more advanced

search functions, which should also be more useful for researchers.⁹ Chinese-language character search capability for village and county names was also added.

Yu’s research team also began working with the Stanford University Spatial History Lab, a project that grew out of multidisciplinary collaborations developed by historian Richard White of Stanford’s Bill Lane Center for the American West. As with the earlier stage of work by Sally Hermansen’s students on the Chinese head tax database, the continuing work with the Stanford spatial history team emphasizes the generative potential of visualization to highlight and disclose aggregate patterns that otherwise would be nearly impossible to imagine. Using GIS and other visualization tools such as Flash to show temporal changes in spatial patterns, Stanford research students Stephanie Chan and Oliver Khakwani worked with Spatial History Lab Principal Investigator Zephyr Frank, Creative Director Erik Steiner, Spatial Historian Jake Coolidge, and UBC’s Chinese Canadian Stories research team to create visualizations that capture the nodal migration pattern in Canadian cities and small towns from the villages and counties of origin in China. By looking for ways to visualize the kinship networks and continually repeating spatial distribution of family chain migration from the same villages, we hope to realize the potential of spatial history approaches to capture both temporal and spatial patterns from large-scale data sets such as the Chinese Head Tax Register.

The first two results of the collaboration between UBC and Stanford’s Spatial History Lab are now available online.¹⁰ Figure 11.3 is a screen capture of a Flash visualization that shows the flow of Chinese migrants to five

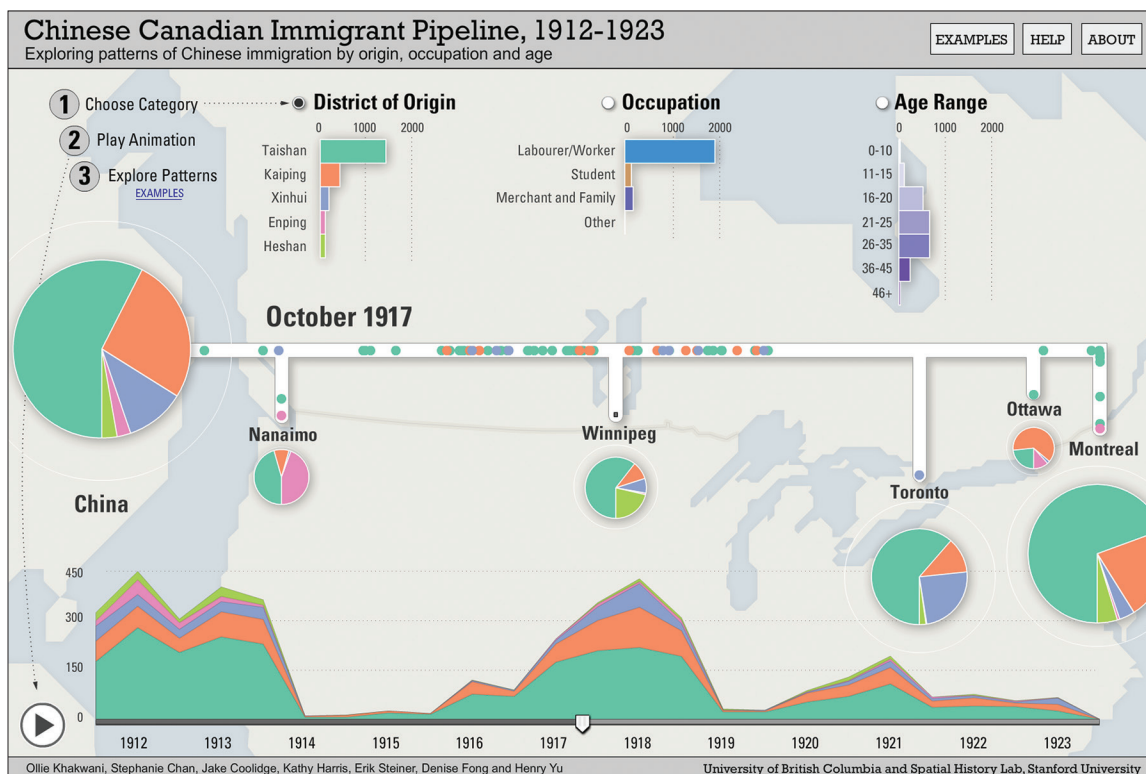


Fig. 11.4. Visualizing the flow of Chinese migrants to five Canadian cities between 1912 and 1923. (Courtesy of the Spatial History Project, Center for Spatial and Textual Analysis [CESTA], Stanford University.)

cities in Canada. Initially named the “gumball machine” in its early conception, the visualization was designed to capture the ebb and flow of migrants by their county origins over a ten-year period, showing each individual migrant, colour-coded to show either their county of origin, their profession, or their age and how each of these three variables was reflected in the migration pattern to the various Canadian cities. We explicitly aimed at creating a visualization that would allow us to see aggregate patterns changing over time that could not otherwise be understood using just static tables. The power of dynamic visualizations combined with GIS data lies in the ability to capture temporal change along with spatial relationships.

As shown by the original visualization from which Fig. 11.4 is drawn, creating a number of datasets representing change over time that can then be played as a dynamic visualization allows a historical researcher to see aggregate patterns shift and to capture relationships between variables that could be imagined through a careful analysis of data but would otherwise be impossible to render visually.

A further series of analyses using a small subset of the head tax database was undertaken by Stanford student Stephanie Chan, using the software program Gephi, originally designed to analyze the relationship between websites in terms of web traffic. Chan and Spatial Lab Creative Director Erik Steiner worked with Yu

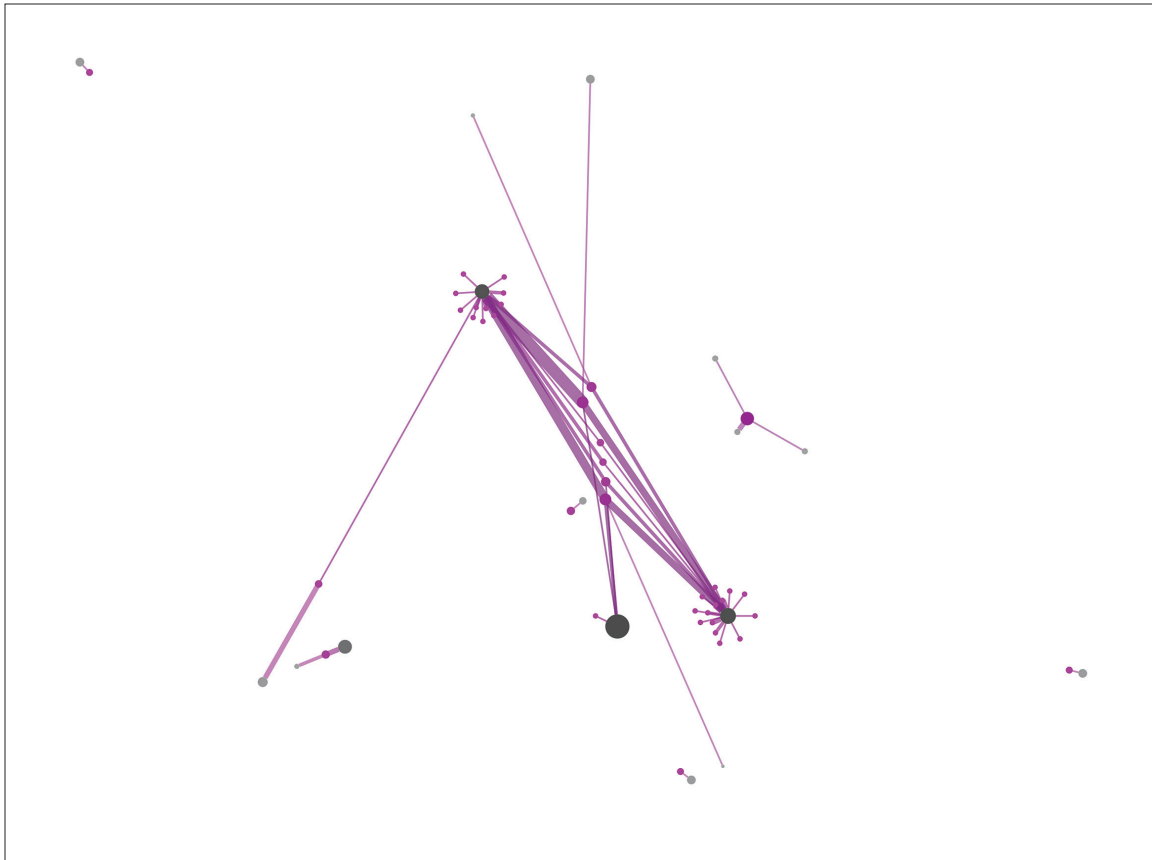


Fig. 11.5. Preliminary visualization using Gephi of the migration patterns to Saskatchewan of the Mah family, 1912–23. Using the variables of family name, village origin, and destination in Saskatchewan, Stanford researcher Stephanie Chan used Gephi to produce network patterns for four Chinese family lineages that visualize the weighted correspondence of family name and village origin in creating family chains and connection between destinations. This preliminary visualization describes the Mah family in Saskatchewan. The length of the lines reflect the weight of connection, with shorter lines reflecting a stronger correspondence. (Courtesy of the Spatial History Project, Center for Spatial and Textual Analysis [CESTA], Stanford University.)

to visualize the migration patterns of four different clans to the Prairie province of Saskatchewan (the Yee, Mah, Kwong, and Wong families, which accounted for over 50% of Chinese Canadians migrating to Saskatchewan). Using the variables of family name, village origin, and destination in Saskatchewan, Chan produced network patterns for each of the four families

that reflected visually the weighted correspondence of family name and village origin in creating “family chains” that could be compared to the importance of shared location. Another way to understand this question would be to ask, if I were a Mah family member in Saskatoon in 1920, would I get better information about Swift Current if I asked another member

of the Mah family in Saskatoon or if I travelled to Swift Current to see for myself? The aim was to capture the weight of shared family name and village origin in network patterns, and, by extension, the quality of information and intelligence that would pass along family networks. Although the visualizations are still preliminary (Fig. 11.4 shows the visualized pattern for the Mah family), the initial results show that 1) each of the families showed very different patterns, and 2) as the results are analyzed, it will be necessary to use other historical sources, and in particular oral histories and interviews of migrants and their descendants (few of the original migrants are still alive) to discover the meaning of these different patterns.

Perhaps no other lesson from the Chinese Canadian Stories project and other projects at UBC using GIS mapping techniques to visualize historical data has been more clear that the most effective use of aggregate data has been in combination with other methodologies. The discriminatory nature of the original gathering of the data in the Chinese Head Tax Registry created the ironic consequence that those most unwanted by Canada and the target of racial discrimination and exclusionary legislation were also those for whom we had the most useful statistical data. But in order for this irony to have a happy consequence rather than just a perverse twist of history, there needed to be more than just data analysis. The Community Historical Recognition Program that funded the Chinese Canadian Stories project was created by the federal government as part of its official apology in 2006 for the nation's long history of anti-Chinese legislation and discrimination. That the Chinese Canadian Stories project was able to use Canada's meticulous records of surveillance in order to bring alive

again the stories of those 97,123 migrants was the result of the database being a part of a larger concerted, collaborative effort to gather life histories and to collect the oft-ignored histories of Chinese Canadians.

NOTES

- 1 The proceeds were also a significant source of revenue for both governments, and between 1885 and 1923 (when Chinese were formally excluded from Canada), they evenly split over \$23 million – the equivalent of well over \$1 billion in today's currency.
- 2 See <http://www.collectionscanada.gc.ca/chinese-canadians/021022-3000-e.html>.
- 3 See http://chrp.library.ubc.ca/headtax_search/.
- 4 W. Peter Ward, "Stature, Migration and Human Welfare in South China, 1850–1930," *Economics and Human Biology*, in press, corrected proof available online: <http://www.sciencedirect.com/science/article/pii/S1570677X12001013>.
- 5 See <http://asian.library.ubc.ca/files/2012/01/Head-Tax-brochure2.pdf>, http://burton.library.ubc.ca/hclmbc/Documents/ZhongshanTaishan_exhibit_finalscreen.pdf, and <http://ccs.library.ubc.ca/en/headtax/mapping.html>.
- 6 The project can be accessed at <http://chinesecanadian.ubc.ca>.
- 7 <http://ccs.library.ubc.ca/game/index.html>.
- 8 <http://ccs.library.ubc.ca/en/GMQ/index.html>. The Chung Collection is available online at <http://digitalcollections.library.ubc.ca/cdm/landingpage/collection/chung>.
- 9 http://chrp.library.ubc.ca/headtax_search/.
- 10 See at <http://www.stanford.edu/group/spatialhistory/cgi-bin/site/project.php?id=1049>.

