Heat

- Toronto can have warm summers
- Will get worse with climate change
- A 1936 style summer heatwave plus a grid failure would kill large numbers in Toronto
Heat in Toronto

• An issue of the city’s environmental history

Whew—But it’s Hot!

You can’t escape it. Ice water only adds fuel to the flame and enhances the danger of exhaustion. Alcoholic beverages increase the temperature and decrease the vitality. Gaseous preparations of essential oils and coloring matter, sold under the broad title of “soft drinks,” are injurious to the stomach, deleterious to the blood. But there is a drink—a delicious, sparkling, effervescent drink—that will not only make you cool, but do you good. You know it—who doesn’t? You have enjoyed it—who hasn’t?

There’s no need to sing the virtues of

HIRES ROOTBEER

Composed of the very ingredients that physicians have used in all ages to purify the blood, strengthen the nerves and tone the stomach, it becomes not only a delicious means of soothing the parched palate, but of countering the enervating effects of the heat. For those who are exposed to the sun, for those who are shut off from proper ventilation, for the mother, the baby, the world in general, there is nothing so delicious as an ice cold glass of HIRES Rootbeer.


THE CHARLES E. HIRES COMPANY, PHILADELPHIA, PA.
Urban Heat Island

• The city core is warmer than its rural surroundings
Fig. 5.10 The heat island of London shown by isotherms of minimum temperatures (both °C and °F). Dashed lines are uncertain (from Chandler, 1965).
The urban heat island

• Thermal mass of buildings
• Urban heat sources
• Roofs retard radiation to the sky
The Growth of the Thermal Mass

• Hectares of dense brick & stone construction in Toronto:
  – 1870: 64
  – 1880: 142
  – 1890: 362
  – 1900: 420
Heat Island History

• The expansion of Toronto’s thermal mass suggests the heat island may have begun in the 19th Century

• What do climatologists say?
Toronto’s Urban Heat Island

- From c. 1920 (Gough and Rozanov)
- From c. 1900 (Dugas 1978)
Toronto Observatory: Degree Days

February Heating

July Cooling
Heat Island History

• Did Toronto’s heat island begin earlier than 1900-1920?

• Need downtown temperatures
  – Fragmentary, but available in historic newspapers
  – Focus on episodes of extreme heat/cold
  – Allows us to calculate Delta-T
Toronto Urban Heat Island: Values of ΔT, Summer Daytime

Temperature (°C)

Year

1860 1870 1880 1890 1900 1910 1920 1930 1940
Can we map the heat island?

- Requires spatial arrays of temperature
  - Available in Edwardian newspapers
Toronto's Heat Island
Overnight Lows
4 February, 1908
Toronto's Heat Island
Overnight Lows
4 January, 1910
Toronto's Heat Island
Daytime Highs
8 July, 1936
Heat-Related Deaths

- Another aid to mapping urban temperatures
Reactions to Urban Heat

- As Toronto’s summer heat intensifies over time, how do people react?
Creation of Suburbs

• Suburbs are developed in the cooler spots of the city’s thermal geography
  – For those with a little money
  – Cool buildings, verandahs, green space, shade trees
Creation of Parks

- Toronto’s Park System created from 1870s onwards
  - Mainly in the suburbs
  - Parks described as “breathing spots”
People went on Vacation

- Short-trip excursion tourism becomes a major activity from mid 1870s
  - Steamers, rail and streetcar excursions,
- Emergence of excursion resorts
  - Lorne Park, Victoria Park, Scarborough Beach, Grimsby Beach, Toronto Islands, El Dorado Park
People went on Vacation

- Creation of cottage resorts for middle and upper classes
  - Police have to patrol the homes of vacationers
Summer homes of the Toronto Elite, 1921
in Relation to the 6 June 1925 Heat Island

Summer homes
The Effects of Summer Vacations

- Disrupted newspaper circulation
- Loss of carriage-trade customers disrupted summer retailing
  - Downtown Toronto switches to summer early closing from 1870s
Some Conclusions

• We can demonstrate that
  – Toronto has a heat island dating from Victorian times
  – Historic urban heat patterns are mappable
  – Urban heat affects urban activity, helps create urban and exurban landscapes
  – Suggests that urban historians need to pay attention to urban heat
Some Conclusions

- Climatologists
  - Are aware of the heat island issue
  - But underestimate its antiquity, historic strength
- Urban climatic history is *terra incognita*
  - Urban historians don’t do climatology
  - Climatologists don’t do history
- It is time to explore it
  - And we can
Heat-wave of July 1988

- Toronto was hot and smoggy that summer
- 7 Jul 1988:
  - Air Quality Index reached 74 in Toronto
Toronto July 1988

Deaths per Day

Air Quality Index

Deaths

Air Quality Index

01-Jul-88 03-Jul-88 05-Jul-88 07-Jul-88 09-Jul-88 11-Jul-88 13-Jul-88 15-Jul-88

Deaths per Day

0 10 20 30 40 50 60 70 80

01-Jul-88 03-Jul-88 05-Jul-88 07-Jul-88 09-Jul-88 11-Jul-88 13-Jul-88 15-Jul-88
Heat-wave of July 1988

• Officially the death toll was around 5
• But 100 excess deaths in Toronto judging by the death notices in the *Toronto Star*
• A deadly mixture of heat & smog
• Lots of elderly victims
  – Metro Toronto nursing homes lacked air conditioning
  – July 7 smog takes days to kill its victims
What of Toronto?

- Aug 2016 the hottest on record
- Steady rise in heat-related deaths in the GTA over the past 100 years
- Seems to rise exponentially with increases in delta-T
Nightmare Scenario

• A 1936-style heat wave occurs in Toronto
• Accompanied by an electrical grid failure
  – Knocks out air conditioning, cooling, refrigeration
• Population much older than in 1936
• Delta-T is now 5.5 degrees
• Casualties in the 1000-10000 range?
  – Would be the largest natural disaster death toll in the city’s history
Contemporary heat issues

- Areas with good vegetation cover avoid the worst of the heat
- Suburban rooftops get into the 50s and 60s degrees C on a hot summer day
- Downtown cooled by lake breezes
- Increasingly a suburban heat island problem
Températures superficielles apparentes le 18 juillet 1985 dans la RMR de Toronto
Classification des températures selon la moyenne (23,54°C)
Urban Wind & Heat

• Wind and heat are ‘sleeper issues’ in Toronto

• But Toronto’s urban wind canyons and its heat island have been producing deadly conditions for a century already
  – Issues with limited public management

• Toronto’s heat island could produce major death tolls
  – Bigger than 1918 influenza
Urban Wind & Heat

• It’s time for scholars and public officials to take the challenges of the urban atmosphere more seriously