

The Halifax Explosion

6 December 1917

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Overview/The Highlights

The Event:

- Collision and Explosion of Ammunition Ship Mont Blanc
- "Largest man-made explosion prior to atomic weapons"
- Appx. 1500 Killed outright. >2000 total dead. >6000 injured
- Massive Canadian and northeast US Response
- Long term recovery efforts

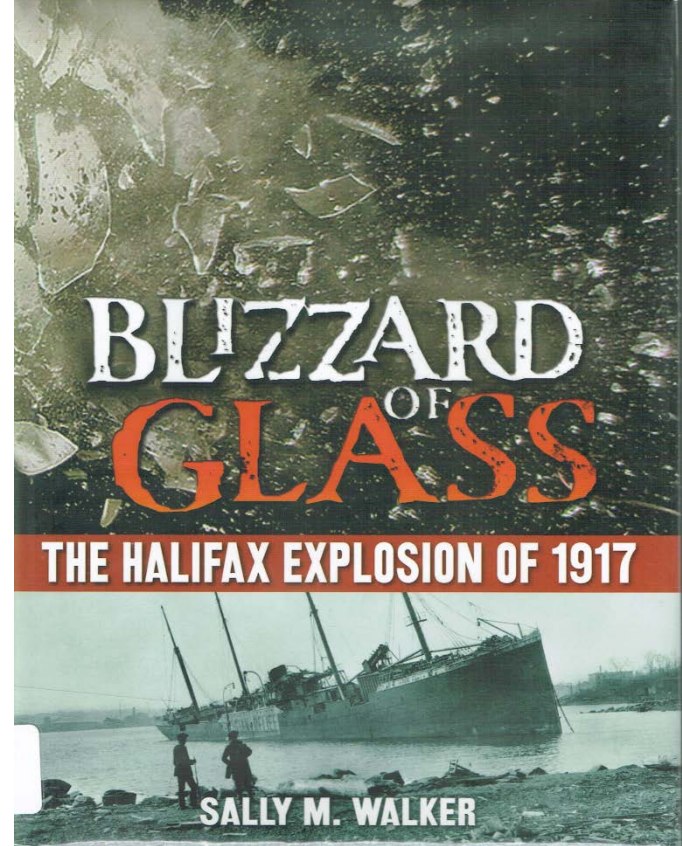
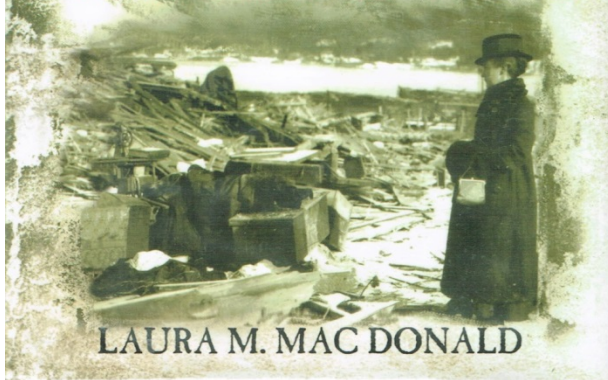
Issue/Information Areas/Areas of Interest:

- Disaster Management
- Red Cross Operations
- Mutual Aid
- Recovery

December 6, 1917. Halifax, Nova Scotia.

A munitions ship bound for the war in Europe collided with a vessel in the Narrows of the harbor, triggering a catastrophic explosion that destroyed much of the city. Within minutes a tsunami engulfed parts of the waterfront. That evening a blizzard buried Halifax, isolating it from the world ...

CURSE OF THE NARROWS



<http://www.cbc.ca/halifaxexplosion/>

<http://www.halifaxexplosion.org>

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1955605/>

<http://www.americanancestors.org/Tree.aspx>

http://military.wikia.com/wiki/Halifax_Explosion

Apologies

- Only enough time/space to briefly mention some of the many organizations involved
- No way to judge nor any intent to judge relative responses from various organizations
- Use of quotes throughout

The Situation. December 1917

Recent Disasters (US) and Red Cross Planning

 San Francisco – 1906 Earthquake (3000 fatalities and 80% of the city destroyed)

 Chelsea, MA – 1908 Fire

Titanic (1912)

Technology of the time

 Communications – Ship and Land

 Travel

WWI

 Wartime port operations and rules in Halifax

 Halifax – Reception/Staging for wounded soldiers

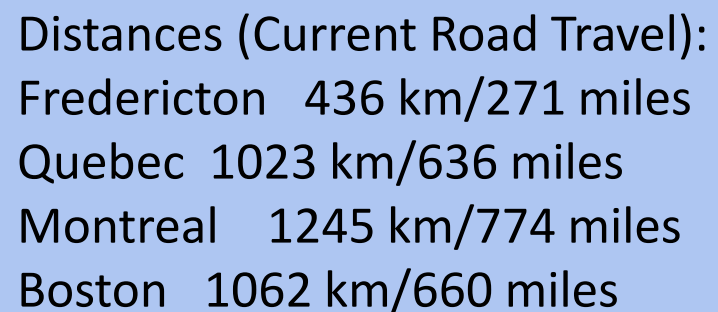
 Mass. Public Safety Committee and Volunteerism

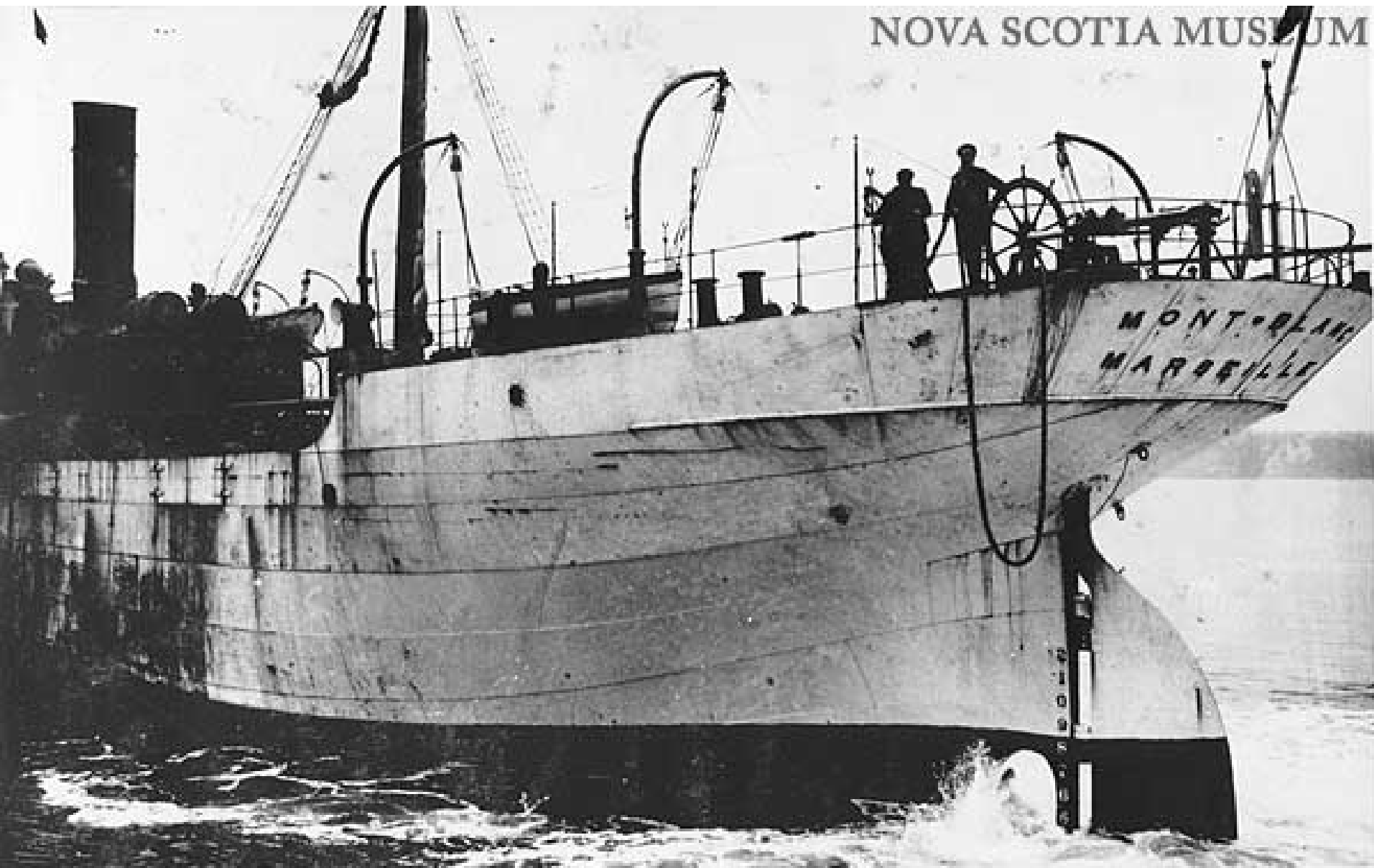
Winter

Politics

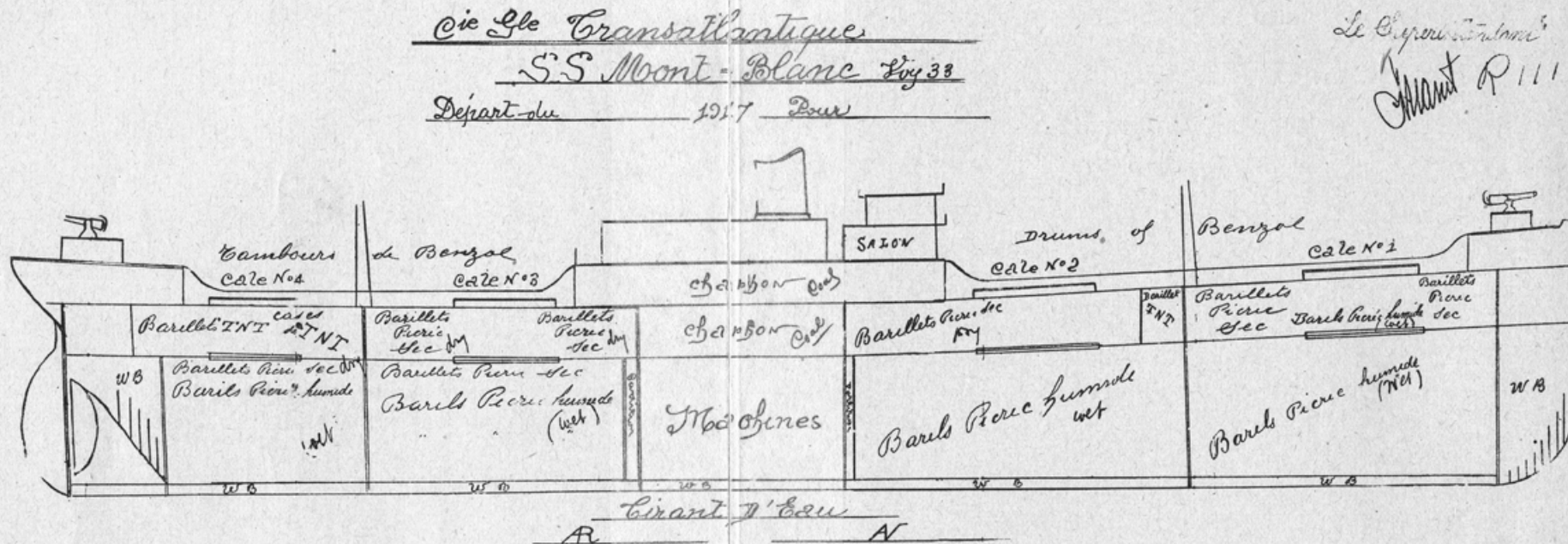
 Relations with France (Mont Blanc – French ship)

 Canadian Navy (10 years old)





Mont Blanc



The Mont-Blanc

French general cargo and munitions ship

320 feet long, 44.8 ft wide, with and a depth of 15.3 feet.

Gross tonnage of 3121 tons, with a net cargo capacity of 2252 tons.

Crew - 41 French sailors.

The freight manifest for *Mont-Blanc*

Explosives	Quantity	Value in 1917 US\$
TNT	226,797 kg	\$240,750
Wet picric acid	1,602,519 kg	\$2,230,999
Dry picric acid	544,311 kg	\$960,000
Guncotton	56,301 kg	\$65,165
Benzol	223,188 kg	\$104,376
Totals	2,653,115 kg	\$3,601,290

Source: *Ground Zero: A Reassessment of the 1917 Explosion in Halifax Harbor*

* + Deck Gun Ammunition

* 2,653,115kg = 5,849,117.35 lbs. = 2,924.59 tons



The Imo

Gross tonnage of 5043 gross, with a net tonnage of 3161 tons.

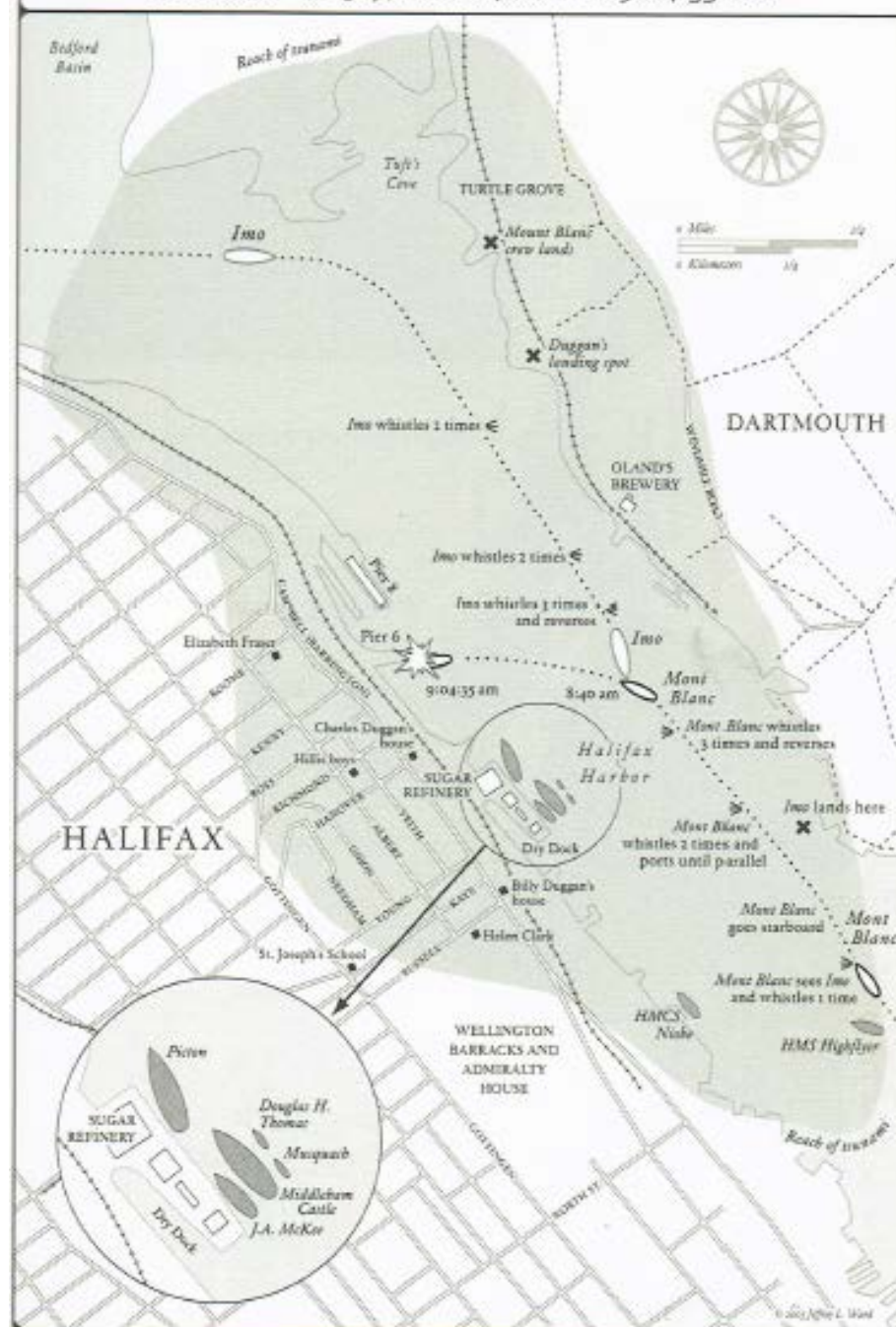
430.7 feet long, 45.2 feet wide, with a depth of 30.3 feet.

Crew of 39

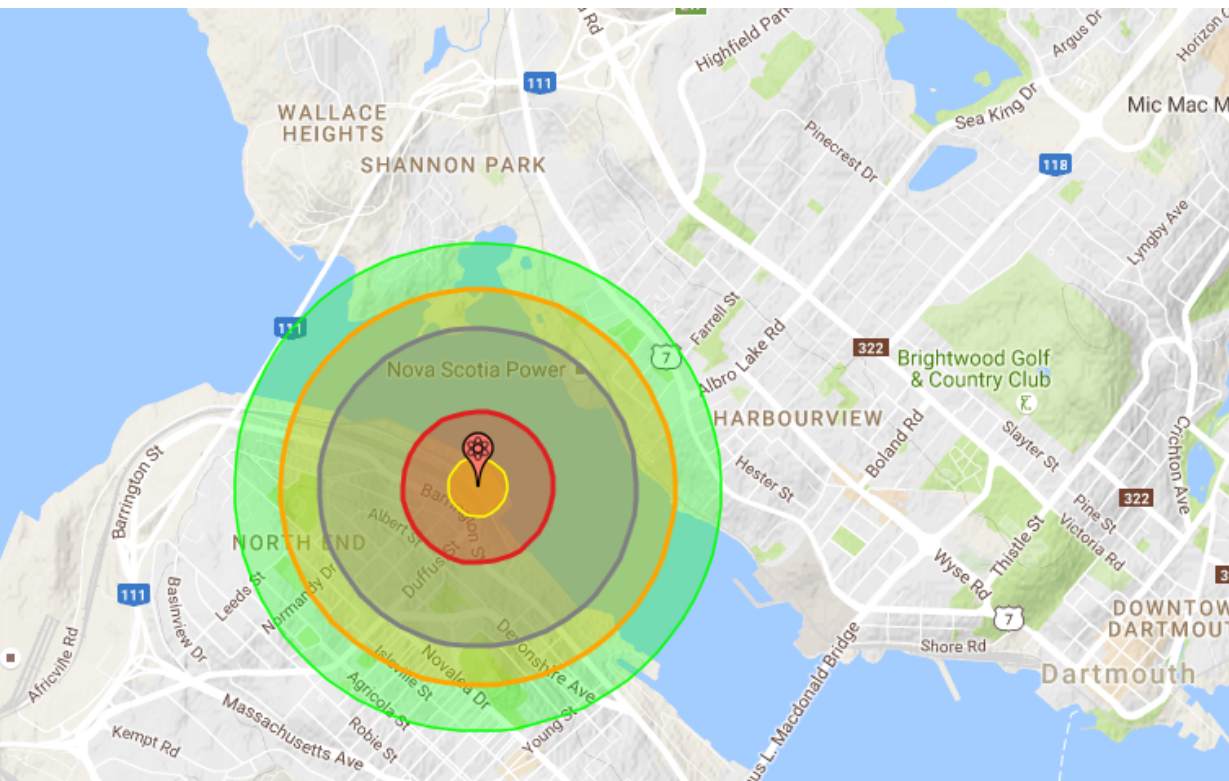


December 6, 1917, est. 8:40 am to 9:04:35 am

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3KT Nuclear Blast Estimate. 2016



NUKEMAP

2.42 : FAQ

Effects radii for 3 kiloton surface burst (smallest to largest): ▼

● Fireball radius: 120 m (0.05 km²)

Maximum size of the nuclear fireball; relevance to lived effects depends on height of detonation. If it touches the ground, the amount of radioactive fallout is significantly increased.

● Air blast radius (20 psi): 310 m (0.31 km²)

At 20 psi overpressure, heavily built concrete buildings are severely damaged or demolished; fatalities approach 100%.

● Air blast radius (5 psi): 0.66 km (1.37 km²)

At 5 psi overpressure, most residential buildings collapse, injuries are universal, fatalities are widespread.

● Thermal radiation radius (3rd degree burns): 0.82 km (2.13 km²)

Third degree burns extend throughout the layers of skin, and are often painless because they destroy the pain nerves. They can cause severe scarring or dismemberment, and can require amputation. 100% probability for 3rd degree burns at this yield is 7.7 cal/cm².

● Radiation radius (500 rem): 1.01 km (3.23 km²)

500 rem radiation dose; without medical treatment, there can be expected between 50% and 90% mortality from acute effects alone. Dying takes between several hours and several weeks.

Note: Rounding accounts for any inconsistencies in the above numbers.

Estimated fatalities:

2,180

Estimated injuries:

6,650

In any given 24-hour period, there are approximately 22,256 people in the 1 psi range of the most recent detonation.

<http://nuclearsecrecy.com/nukemap/>



Immediate Impact:

Explosive force (studied by Oppenheimer) , Mont Blanc (gone),
Tsunami
Ships sunk/damaged (Imo)
Rocks ...

Fires, Search and Rescue, Communications Cut, Roads Disrupted,
etc...
Lots of individual stories

"For almost two square kilometers around Pier 6, nothing was left standing. The blast obliterated most of Richmond: homes, apartments and business... "

"On the Dartmouth side, Tuft's Cove took the brunt of the blast. The small Mi'kmaq settlement of Turtle Grove was obliterated."

Twelve thousand buildings were severely damaged in the Explosion. 1630 were completely destroyed.

German Attack?

fireball height = 1.2 miles

radius of water evaporated = 20 ft.

tsunami radius = 1 to 3 miles

tsunami height = 60 feet

air blast > 756 mph

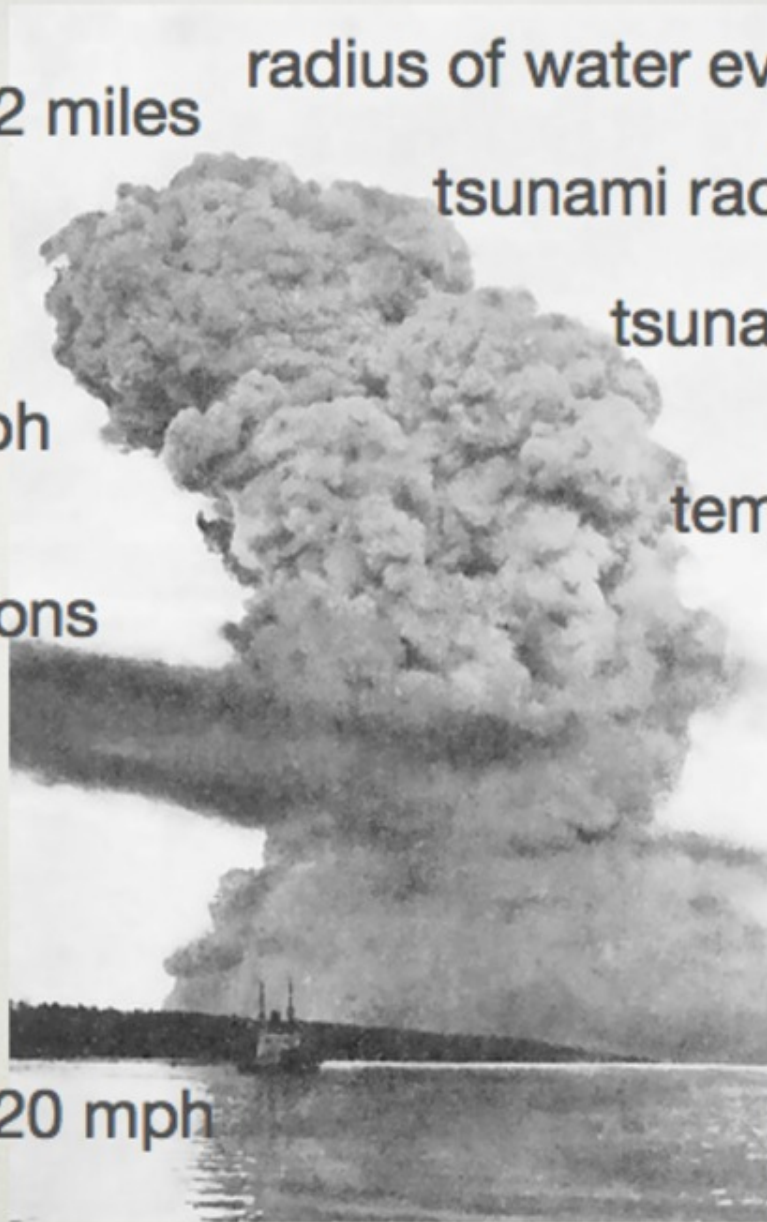
temperature = 9000°F

blast yield = 3 kilotons

Mont Blanc's
6,880,627 lb. iron
hull tossed
upward 1,000 ft.

sonic boom = 13,320 mph

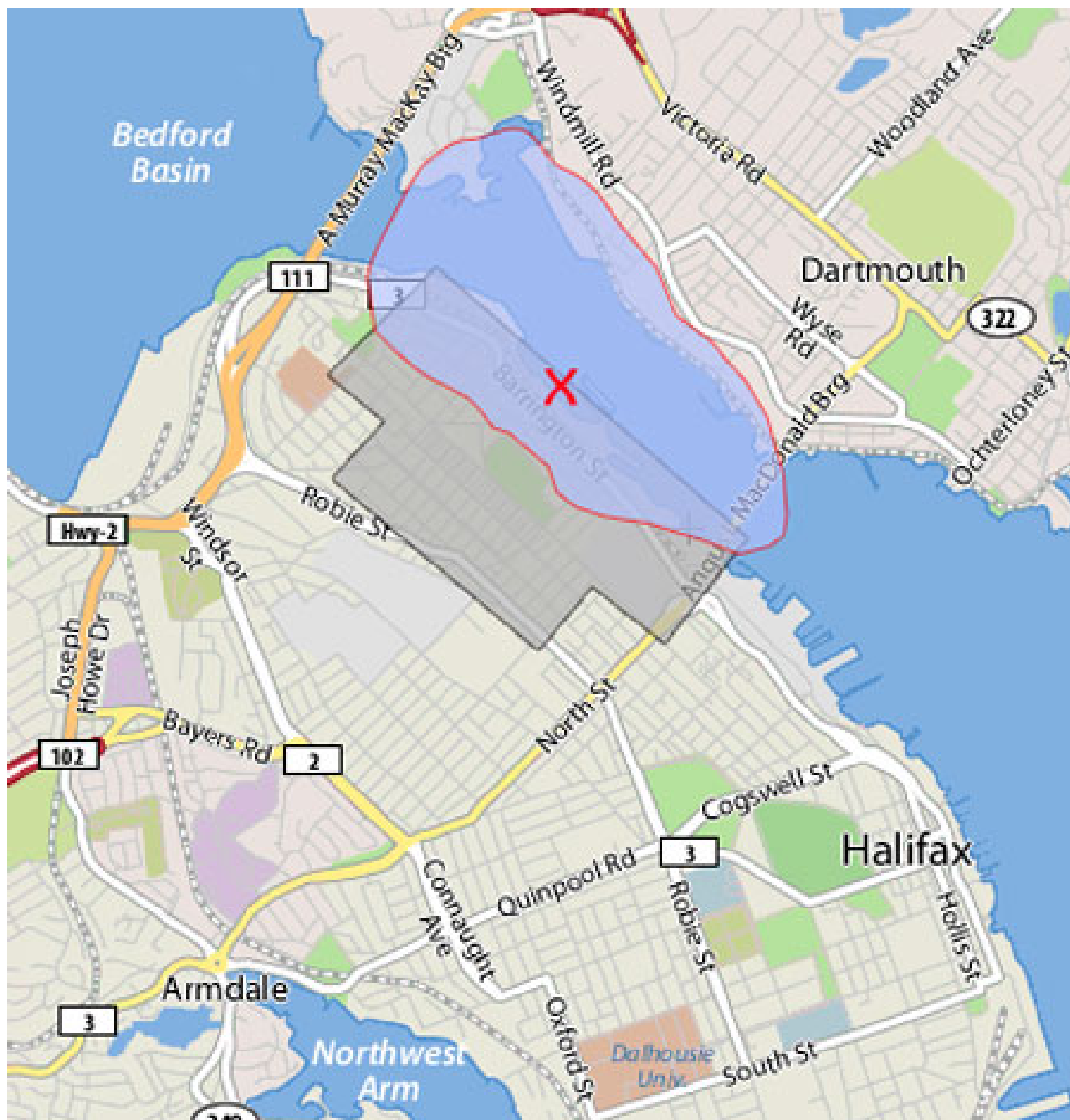
carbon-saturated "black rain" fell for 10 minutes

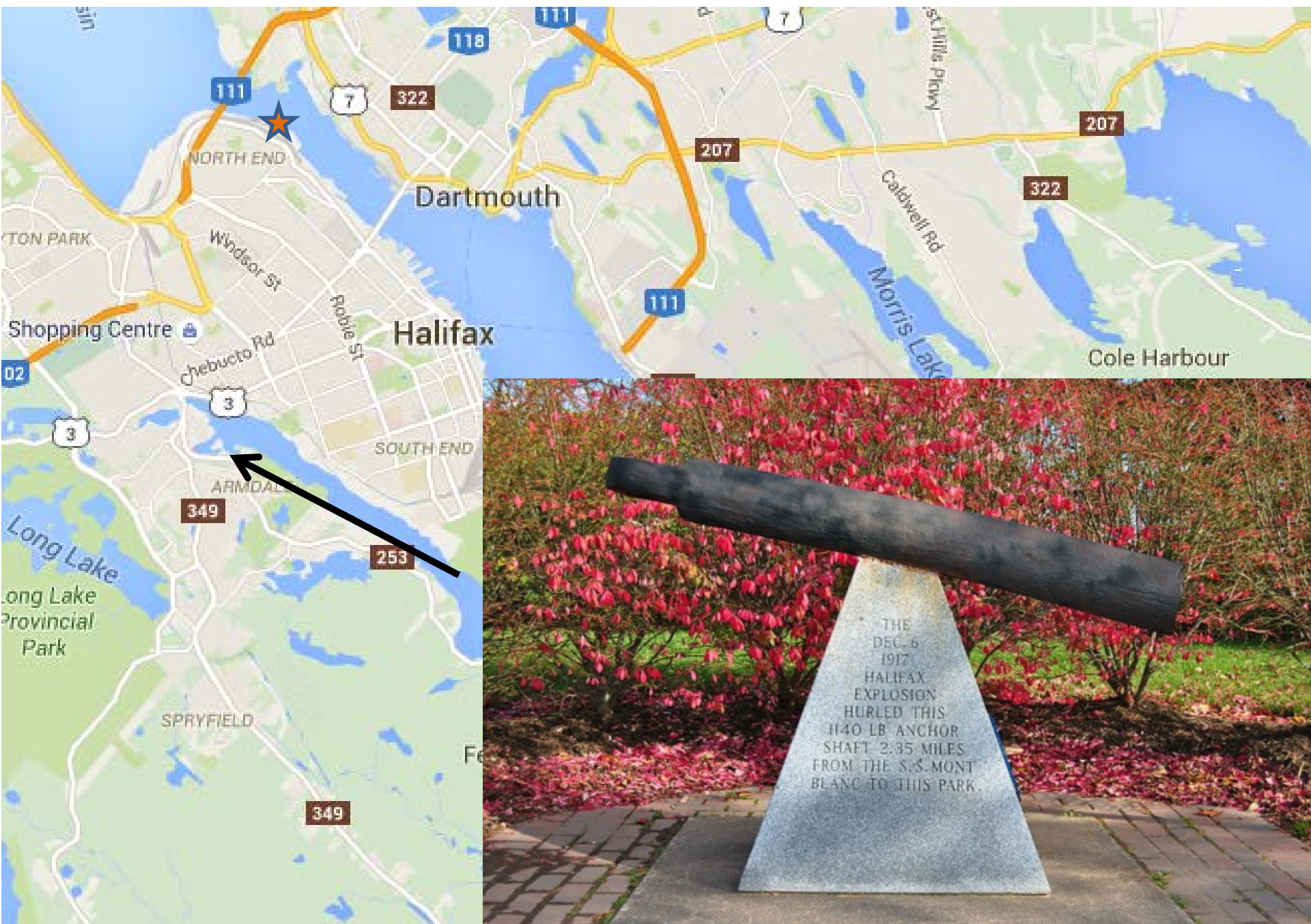


"Buildings within a radius of half a mile of the explosion were totally destroyed and that up to one mile they were very largely rendered uninhabitable and dangerous. No section of Halifax city escaped serious damage...

More or less severe damage was caused as far away as Sackville and Windsor Junction, 9 or 10 miles (away from) the explosion... At Truro, 62 miles, and New Glasgow, 78 miles, the shock was sufficient to jar buildings very appreciably, and even to shake articles from shelves. Even as far away as Charlottetown, 135 miles, and North Cape Breton, 225 miles, the explosion was distinctly felt or heard."

Source: Prof. Howard Bronson of Dalhousie University, in a paper for the Royal Society of Canada, 1918.





THE
DEC. 6
1917
HALIFAX
EXPLOSION
HURLED THIS
1140 LB ANCHOR
SHAFT 2.35 MILES
FROM THE S.S. MONT
BLANC TO THIS PARK.







City Hall

"... but at 11:30 politicians and citizens both convened an emergency meeting. ... Colwell, Grant, MacIlreith, and five members of the council agreed on creating five instant committees: transportation, food, housing, finance, and mortuary. At quarter after twelve the meeting adjourned until 3:00 p.m. "

Hospitals

"Halifax had four public, four military and seven private hospitals in 1917. They ranged in size from a few dozen to 200 beds, and they were soon overflowing.

The main civilian hospital in Halifax was the Victoria General.

Behind the Citadel, Camp Hill Hospital had just been built for convalescent soldiers."

"As the days passed, temporary hospitals were set up at various locations like the YMCA, the Halifax Ladies' College and the Academy of Music."





THEODORE
MACDONALD
HALIFAX

Blinded Personnel

Fully Blinded 41 Half-Blinded 249

"A joint committee of the American Red Cross and the Halifax School for the Blind was appointed ...

At their suggestion, Miss Lotta S. Rand of the Massachusetts Commission for the Blind was invited to go to Halifax for three months at the expense of the Red Cross for the purpose of directing the follow-up work and devising further means of training and education."

American Red Cross Disaster Preparation

"... after being caught unawares in San Francisco, the Red Cross made disaster relief first a national priority, and then experimented with organizing local disaster relief committees. Boston and New York set up the first two committees.

"Tasked" and requested by President Roosevelt
Response and Rehabilitation Phases in Disaster Handbook

New York was already rushing the first of several trains to Halifax, filled with twenty engineers, doctors, nurses, \$15,000 worth of tools, \$150,000 worth of lumber, one thousand portable houses, and thirty thousand pounds of bandages."

Massachusetts Committee on Public Safety

- First of its kind in the US (Sworn in Feb 10, 1917)
- Highest level of Government and Private leaders of the community

Massachusetts Response

“The committee reached out to the banks, the railroads and the universities that were represented on its board. Harvard University emptied its medical school and, with the Red Cross, packed up the makings of portable surgical suites. Nurses from the hospitals were recruited. Cash was assembled from banks.”

“The Massachusetts Halifax Relief Committee raised one million dollars for supplies and relief efforts, an amount equal to \$20 million today. ”



Abraham Ratschesky – leader of
Massachusetts relief effort

- First Boston relief train departed North Station 6 December 10:17 p.m.
- 11 doctors, 10 nurses, journalists, Red Cross plus supplies
- Arrived in Halifax 7 a.m. on Saturday, December 8 (delayed by snow storm)

Second Boston Train

- Harvard Hospital Unit (designed for European employment)
- 500-bed hospital
- “only unit to arrive in Halifax with its own complete nursing staff of sixty-five women and five men.”



Gov. McCall of Massachusetts visiting

Recovery (Rehabilitation)

- "... Christian Lantz, who was in charge of Chelsea rehabilitation, to come to Halifax to consult."
- Deliberate plan for urban renewal

Halifax Relief Commission

- Sworn in on January 22, 1918
- Divided into four areas: rehabilitation, reconstruction, medical, and finance.
- Distributed Pensions to victims
- Remained in operation until 1976.

Selected Donations:

Australia	\$250,000.00
Chicago	\$125,000. 00
Ontario	\$100,000. 00
The UK	\$1M
London	\$600,000.00
The British Red Cross	\$125,000.00
King George V	\$5000.00

* Total Donations approximately \$30 million

Individual Assistance

"A claims department was set up to deal with fifteen thousand claims for furnishings and clothing worth less than \$100. Of the 328 streets in Halifax, claims were submitted from 229. Claimants were allotted ten minutes to make their case and checks were issued immediately upon the decision."

Orphans

- Orphan committee dealt with 500 children
- 70 children lost both parents. 120 lost their mothers, and 80 lost their fathers.
- Of the 120 children who had lost their mothers, only 9 had fathers in Halifax. The fathers of the other 111 were all serving overseas

Halifax Temporary Morgue

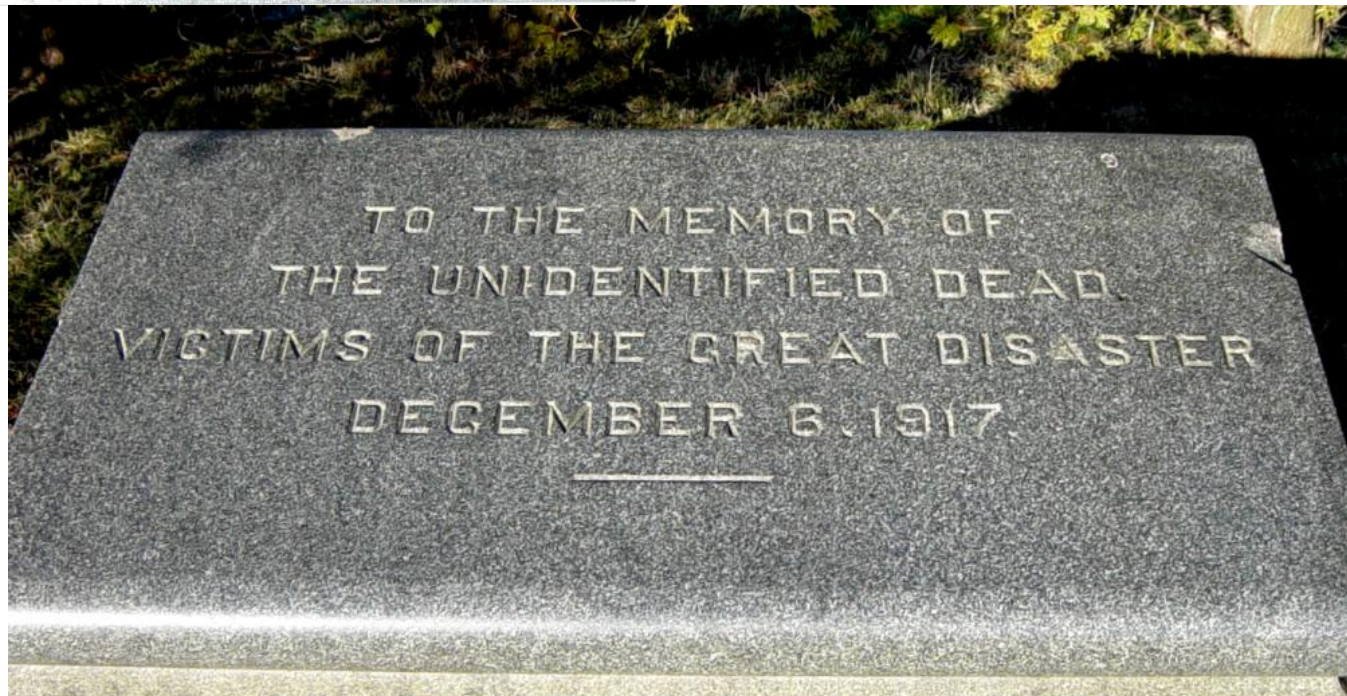
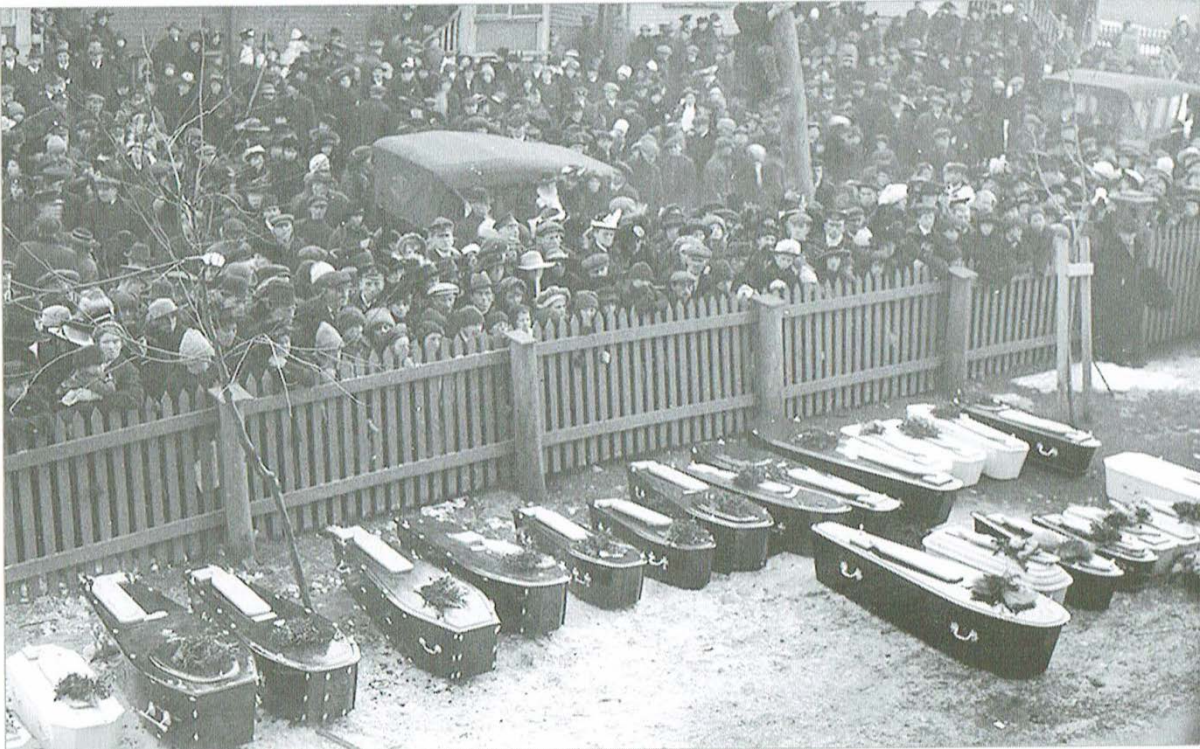


Mass Funeral Monday, December 17, 1917



Halifax explosion 1917

#2453



Investigation and Responsibility

“The official enquiry opened less than a week after the explosion. The captain and pilot of the *Mont-Blanc* and the naval commanding officer were charged with manslaughter and released on bail. Later the charges were dropped, because gross negligence causing death could not be proved against any one of them. In the Nova Scotia District of the Exchequer Court of Canada in April, 1918, the *Mont-Blanc* was declared solely to blame for the disaster. In May, 1919, on appeal to the Supreme Court of Canada, both ships were judged equally at fault. The Privy Council in London, at that time the ultimate authority, agreed with the Supreme Court's verdict.

Thus no blame was ever laid ...”





