

Forensics if Necessary: Similarities and Changes in Canadian Mass Death Incidents¹

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Introduction

Until about half a century ago, the bodies of persons who died in mass death incidents were collected and identified mainly by those who knew them -- families and fellow workers. Starting around the mid nineteen fifties some dead were identified using forensics, first dental records and fingerprints and, later, DNA. However, even when forensic records such as fingerprints were readily available, they were not always used. It seems that it is forensics if necessary but not necessarily forensics. Even if the actual identification is still informal, today those who die in a mass death incident are as quickly as possible taken under the control of the authorities, usually police and the coroner. Relatives and fellow workers are kept at arm's length until identification is complete.

Although Canada is not a disaster prone country, over the years there have been a number of incidents involving a significant number of fatalities including shipping incidents such as *Empress of Ireland*, mine accidents, for example at

Springhill, Nova Scotia, air crashes, including Swissair 111 and other types of tragedies. Inevitably, in the wake of such incidents, those who knew the victims wanted their bodies recovered and identified. This chapter shows how this was done in a number of Canadian mass death incidents. Its purpose is to familiarize readers with what has changed and what has not changed in the way this has been done over more than a century.

When police and forensic scientists from 34 countries including Canada reached agreement as to how they would identify the dead from the 2004 Indian Ocean tsunami in both Thailand and Sri Lanka, they specified that only three criteria would be acceptable: the matching of pre-death and post-death finger prints, dental records and/or DNA. Anything else – clothing, scars, tattoos, jewellery – could be corroborating evidence but not be sufficient to identify someone.¹ The decision seemed to confirm that the once common practice of having persons who knew those who died identify them was no longer acceptable. However, a review of Canadian mass death incidents suggests that for more than half a century, forensics have been used to identify some Canadian disaster victims; but visual identification – even though it is known to be faulty – is still widely used: the process, it appears, is forensics if necessary but not necessarily forensics. In fact, visual identification may still be used when forensic techniques are also used because the cause of death is an issue, as was true after Air India and *Swissair III*.

While the use of forensics has been erratic, the pattern of dealing with mass death has definitely changed, especially since the middle of the last century. Until then, after a mass death incident, bodies were usually recovered by fellow workers or by survivors or, occasionally, by organized search parties, taken to a place where they could be identified by those who knew them – usually family or fellow workers -- then released for handling by local funeral directors. The process moved along very quickly and funerals were held within days of an incident. Now bodies may be collected by volunteers but are usually though not always then taken under the control of death professionals – the coroner or medical examiner or police – and not released until identification is confirmed by these officials, though it may still be visual. After that, the bodies are often handed over to a firm such as Kenyon International Emergency Services, formerly British, now based in Texas, that specializes in the handling of the dead and their effects. Local funeral directors are cut out of the response unless they have a contract with Kenyon. These changes mean that relatives and local death service personnel are distanced from the procedures and what once was done in days may take weeks or even months though this is partly because identification procedures have become more sophisticated. One other change has occurred in some countries including Canada: because of privacy legislation lists of the missing and the dead are no longer always released.

These changing patterns are illustrated with a series of brief case studies covering everything from a munitions' ship explosion, a ship wreck, a fire on a cruise ship, an air crash, a hurricane, a mine disaster, another air crash, a train wreck and a tornado, an oil rig capsizing, two air crashes into the ocean and the Indian Ocean tsunami. These case studies are not a complete history of Canadian mass death but were selected to illustrate how things were done. While much of the data was acquired from media reports and is referenced, some was acquired on the understanding no human sources would be identified and that no information would be used that would identify specific victims. Incidentally, the worst Canadian mass death incident – the 1918-20 pandemic with an estimated 50,000 dead -- is omitted. Although there are anecdotal accounts of what happened in terms of dealing with the dead at that time, there is, as yet, no research.³

Literature Review

Until after the December 26, 2004, Indian Ocean Tsunami, there was a fairly sparse literature on the way disaster mass death was handled. There was the work by E. L. Quarantelli and his students at the Disaster Research Center (DRC)ⁱⁱ Janet Kitz's chapter in *Ground Zero* on the 1917 Halifax explosion mortuary,ⁱⁱⁱ two journal articles by Joseph Scanlon, one also on Halifax,^{iv} publications by Vanderlyn Pine, a funeral director and sociologist,^v and articles by Japanese physicians after the 1995 Kobe earthquake.^{vi} There were technical articles,^{vii} some by Canadians.^{viii}

Thanks to US National Science Foundation (NSF) funding, which allowed a study of the handling of the dead after the Indian Ocean tsunami, there is new extensive published research on disaster death.^{ix} As well as overviews, it covers such topics as the problems of foreign ministry call centres handling inquiries about missing persons^x and the role of the private sector in Disaster Victim Identification (DVI).^{xi} There is also an extensive review of the response to Thailand and Sri Lanka showing how an emergent international organization was created in both countries to recover and identify the dead.^{xii}

Except for the articles on the 1917 Halifax explosion, all this literature is based on research conducted after the middle of the 20th century and all of it – though this is not explicit – assumes that the patterns it identified were normal. While that was true at the time that research was done, it was not true for earlier periods. Moreover, this literature tends to some extent to over-emphasize the role of forensics. Nevertheless it does show that in the initial stages of a mass death incident, bodies are collected often by private individuals and taken to various

³ The author has received a grant from the Social Sciences and Humanities Research Council of Canada to study how three Ontario communities dealt with death during the pandemic.

public buildings including schools, temples and police stations. That happened in Halifax after the 1917 explosion,^{xiii} in Darwin, Australia after Cyclone Tracy^{xiv} and in Kobe, Japan after the earthquake. It also happened in both Thailand and Sri Lanka after the tsunami. Only after that initial informal response were attempts made to identify the dead. Admittedly, things are different if the mass death incident is at a site that can be controlled. Then the bodies come immediately under the control of emergency agencies: an example of that is the December 12, 1985, crash in Gander, Newfoundland, involving members of the US 101st Airborne.^{xv}

1917: The Halifax Explosion

After the 1917 Halifax explosion (9,000 injured, 1,923 dead) bodies at first were picked up by survivors and taken to funeral homes which were soon overcrowded then to a temporary morgue. No records were kept and where or how the bodies were recovered. Unlike many cities, Halifax had experience with mass death: many of the bodies from *Titanic* were brought to Halifax and stored at a temporary morgue at the Mayflower Curling Club, then on Quinpool Road. Because of that experience, the Halifax Relief Committee realized immediately the need for a morgue and, hours after the explosion, opened one in the basement of Chedebucto School in the North End of the city, where most civilian deaths took place. It was staffed by soldiers who were supervised by a police officer with tuberculosis – he had left the Kentville sanatorium to assist – with record keeping done by Arthur Barnstead, the province's deputy registrar general. (Barnstead's father had done the same job for *Titanic*.) To assist with the handling of the bodies morticians came from nearby Amherst (where Christie Brothers also made most of the coffins used) and from Ontario, which was gradually developing funeral direction as a profession. These men help the police officer supervise the soldiers who cleaned the bodies, wrapped them in sheets and put any personal possessions in numbered bags.

Since 1917 was long before the days of forensic identification the only way bodies could be identified was from personal effects or marks on the body or by someone who knew the victim. In some cases, it seemed that identifying a body would be easy: one body was tattooed with a Norwegian flag horse shoe and female figures also, "Sailor's Grave" and "Good Luck" On left arm there were the figures of a sailor boy and girl and the word, "farewell." It was probably a Norwegian sailor but not one from *IMO* the ship involved in the collision that led to the explosion. It was never identified. Also never identified was a man's body with a gold monogram ring with the initials "H. G. B." The missing presumed dead included Havelock Baker, Lt. Harold Balcom, Herman Baugill, Hiram Beck, Horvad Bungay and two persons named H. Boutilier. The two Boutilier's were

identified. So was Lieutenant Balcom. That still left four unidentified bodies who could have been "H G B." An American soldier who had joined the Canadian Army described the morgue:

Monday was spent at the morgue. A gruesome nauseating job, trying to identify those poor victims by arranging any little scrap of evidence that could be found on them, so the relatives and friends who continually filled the morgue would have a chance to recognize their belongings.... To witness those relatives and friends as they walked along the long lines of victims stretched out in rows, and eagerly awaiting those that were being constantly brought in, was a sad sight. There would be a scream here, a moan or a sob there, then someone would have to be carried away from that horrible scene. The only stimulant we got was a table-spoonful of brandy at the end of the day. There were times when we felt pretty "blue" but we kept on at our unpleasant task trying to arrange the poor creatures in such a way that they could be placed in wooden boxes to await burial later.⁴

Eventually the unidentified bodies were buried in mass graves though records were kept in case someone recognized a body from the material stored in a canvas bag.

1918: Princess Sophia

On October 24, 1918 the steamer *Princess Sophia* became beached on Vanderbilt Reef in the Lynn Canal on Canada's West Coast. The ship was damaged but it did not appear to be in danger of coming off the reef and it was decided that the seas were too violent to risk evacuating her passengers. The following night -- October 25 -- a violent storm blow the *Sophia* off the reef and she sank. There were no survivors. Most victims died by being suffocated by the oil that the *Sophia* leaked as she sank. Others drowned or froze to death in the ocean or on life boats. Of the 343 victims less than 200 were recovered.

⁴ The material on Halifax is from an unpublished book manuscript titled, "*Before 9/11: The 1917 Halifax Explosion*" and from an article by the same author: Scanlon, Joseph (1998) "Dealing with mass death after a community catastrophe: handling bodies after the 1917 Halifax explosion" *Disaster Prevention and Management* Vol. 7 No. 4 pp. 288-304

The bodies that were recovered were picked out of the water by salvage teams or recovered after they washed up on the beach. All were sent to Juneau, Alaska where they were cleaned and where many passengers were known locally and were visually identified by those who knew them. Most of the unidentified were women and children whose clothes had no pockets containing letters, cards or other means of determining their identity. Because it was known that some were from Alaska, some persons who knew the Alaskans on board came to Juneau to identify them.^{xvi} A local man wired a request for Mr. And Mrs. George Billings and children who went recently from Dawson to Prince Rupert, to proceed to Juneau to assist in identifications of five unidentified children's bodies believed to be from Dawson since the Billings had run a restaurant in Dawson and knew all the local children^{xvii} However, mistakes were made though some were corrected:

It has been definitely determined that the body of Mrs. C. Cousins has not yet been recovered. Some of her belongings were found on the person of another victim and this led to the belief that her body had been recovered.^{xviii}

The bodies that had been identified were loaded onto *Princess Alice* and shipped to Victoria where they were laid out in the company wharf turned into a morgue. Relatives had to ask for and receive permits to view and recover the bodies and had to fill out forms and provide a receipt before taking one away. Persons who could not identify themselves as relatives had to have written permission from a relative before a body was released to them. All arrangements for shipping bodies from Victoria were made through the Sands Funeral Company.^{xix} The company issued formal statements describing these arrangements:

When (Princess) Alice arrives here remains will be arranged in alphabetical order in the Belleville Street wharf shed, which has been suitably draped for the occasion. A doctor and nurse will be in attendance.^{xx}

The bodies are to be removed from the boat at seven o'clock in the morning and at nine o'clock the morgue will be open so that relatives may confirm the identification and have caskets removed.^{xxi}

The bodies not identified were to be taken care of by former Yukoners now living in the Lower Mainland. Those bodies were to be buried in a single plot in Mountain View cemetery along with 66 of the identified dead.

1949: Start of Forensics – the *Noronic*

After fire raced through the cruise ship, *Noronic*, in the Toronto harbour in 1949, many of the bodies were burned so badly that there were only charred remains. “Firemen were using pitchforks to unscramble debris and human remains alike. The sight was not pleasant.” One firefighter said, “There are charred remains everywhere. We have to use shovels, because they break into bits.” Repeated calls were made for more and more tarpaulins for the dead. Then shovels were requested. These were used to slide under the burned bodies so they could be shovelled on to the tarpaulins. Two and three victims were placed in the tarpaulins and the shapeless mass was hoisted by four firemen over the ship’s rail to men on the ladders bridging the gap between dock and ship. City and private ambulances and police department maintenance trucks, too, were pressed into service to transport the dead to the temporary morgue.^{xxii}

That morgue was at the Horticultural Building at the Canadian National Exhibition Grounds and there some bodies were identified by relatives, one of whom was a dentist who said he recognized a number of persons, including his brother. As it turned out many of the victims were Americans who had been fingerprinted by the US Federal Bureau of Investigation (FBI) when they got wartime security clearances. The prints showed that some of the initial identifications were wrong and in one case the Ontario coroner had to phone the police in Detroit to ask them to stop a funeral.

At the Horticultural Building, relatives were shown items recovered from the bodies including clothing and jewellery. These were also shown everything from baby clothes, shoes, razors, shaving brush, hotel key and small statuettes. Relatives filed past such articles for hours yesterday in the hope that they might be able to find some clue as to the fate of friends and relatives on board the ill-fated ship.^{xxiii} In addition to personal possessions and fingerprints, the coroner and his staff x-rayed the bodies in the hope they could spot clues such as bone fractures. They also poured through dental records trying to match the records with what dentists saw when they examined the bodies.^{xxiv} The Toronto *Daily Star* reported they even tried approaches suggested by the FBI to obtain fingerprints from badly damaged bodies:

In cases where a hand is lacerated, or burned, and the body fluid has drained out and prints apparently have vanished, glycerine is injected to bring up the prints. The F.B.I designed a special device for ‘cupping’ stiff and damaged fingertips to get impressions. There is also super-sensitive photographic equipment which gives remarkable results.^{xxv}

1954: Moose Jaw – Forensics Again

At 10 a.m. on Thursday, April 8, 1954, a Harvard Trainer plane collided with a Trans-Canada Airlines (TCA)⁵ North Star passenger flight above Moose Jaw Saskatchewan. Both planes crashed to the ground killing the Harvard Trainer pilot, the 35 on board the TCA aircraft and a cleaning lady in a house that was destroyed when hit by flaming debris and nine bodies.^{xxvi} Many other bodies from the crash were scattered over a section of Moose Jaw, mostly on the Willowdale Golf Course fairways. As each body was spotted it was covered with a white sheet and guarded by city police, RCMP or RCAF personnel until it could be taken to a morgue in the Moose Jaw Armouries.

Personal effects found on the bodies were removed and deposited in bags, bearing the same tagged number as the stretcher from which they were taken. More than half the victims – mainly those whose bodies were intact – were identified fairly quickly from those effects and baggage tag were used to mark those bodies.^{xxvii} One woman was identified by her brother through an inscribed wedding ring still on her finger.^{xxviii} However, many bodies were badly burned and the victims' dentists had to be contacted and dental records obtained. "It is pretty difficult to identify some of them," said Inspector James Henry, Moose Jaw city police, who was in charge of the detail handling the job.

While the process of identification was under the control of the coroner and Moose Jaw police, the local authorities requested assistance from those who had worked on the burned victims from the *Noronic* fire. Arrangements were made through the Red Cross, which was assisting with dealing with relatives, to bring one of the pathologists up from Toronto to work with Maurice Ernest, the pathologist in Moose Jaw.^{xxix} Eventually only two unidentified bodies remained, both women, one a stewardess. One was finally identified by matching x-rays taken before death with x-rays of the burned body. That meant – by exclusion – the last body had to be other unidentified female.^{xxx} (Identifying a body by exclusion is possible only when there are very few remaining unidentified remains.)

When the dead come from many different places – as is common after an air crash – arrangements are usually made to ship bodies. After the Moose Jaw crash, for example, Air Canada arranged to transport bodies to Vancouver, Calgary and Edmonton. But funeral services for the pilot of the Harvard trainer and a woman killed when her home was hit by flying debris were held in Moose Jaw. The funeral for acting Pilot Officer Thomas Andrew Thorrat was held at St. Andrew's United Church where he was a member of the choir. The funeral for

⁵ TCA is now Air Canada.

Martha Hadwen was held at Moose Jaw's Alliance Tabernacle. The body of Rupert Don Baugh whose body was used for the inquest was taken for a service at St. Alban's Anglican Church and for burial at Moosomin, Saskatchewan where he grew up. The burial arrangements for three Scottish victims were made by the St. Andrew's Society of Moose Jaw.^{xxxix}

1954: Hurricane Hazel – Back to Visual

After flood waters from Hurricane Hazel caused devastation in a huge area in and around Metro Toronto, there were bodies scattered for miles, some of them carried by flood waters far from where death had occurred. The result was a massive search involving both military personnel and volunteers. One of those searches was done by a helicopter supplied by Ontario Hydro. The pilot of one of those helicopters said, "the toughest job was to get at [the bodies] where they were trapped and entangled in uprooted trees." The bodies were strapped to a helicopter pontoon and brought out one a time to a designated location where ambulances transported them to a designated morgue.^{xxxix} At the same time, there were also massive organized searches on the ground:

By the Old Mill, a great number of soldiers of the RCME and RCASC were joined by about 50 University of Toronto engineering students in the task of clearing away stumps and searching for bodies in the river.^{xxxix}

Units who are calling on their men to turn out are the Governor-General's Horse Guards, the 48th Highlanders of Canada, Third Battalion, Queen's Own Rifles of Canada, 29th Field Regiment, RCA: 8th Signal Regiment, RCCS (to handle communications); No. 5 Column, RCASC (handle transportation); the Group Ordnance Company and the Group Intelligence company.^{xxxix}

The largest and perhaps the final search and debris clean-up of the Humber valley got under way this morning as 800 militia troops, equipped with flame throwers, bulldozers, an[d] amphibious 'alligator,' boats and hundreds of pike poles, spades and crowbars, swept into the valley to search for 17 bodies still missing..." The alligator, the Army's newest weapon, sank into the Humber River just three minutes into the search.^{xxxix}

The Royal Canadian navy sent 50 men to search the mouth of the Etobicoke Creek. Fred and Wilfrid Sauer are hoping that Mary Sauer will be found. Her coat, slip, one shoe and dress had been

found by her son Wilfrid. “Before ‘Operation Search’ was organized, Mr. Sauer arranged for a civilian party of 200 volunteers to search for his wife’s body.^{xxxvi}

Although Toronto had created a fairly sophisticated morgue after *Noronic* and had pioneered in the use of forensic techniques, after Hurricane Hazel the dead were identified visually. Those who were missing a loved one went to the various morgues until they found who they were looking for. One morgue, for example, was created on the second floor of an old fire department building and it was staffed by two University of Toronto students. They had responded to a call for volunteers and were assigned to the morgue when it was discovered one was in medicine and had dealt with cadavers.

The second floor was roughly divided down the middle by portable dividers. The entrance, which was at the back, was to be used for incoming and outgoing bodies, as well as for those people trying to come and identify their loved ones. As you entered the area, the Salvation Army people were doing an outstanding job of assisting the distraught people in search of their loved ones. Behind the partition [we] were accepting the incoming bodies. Our job of setting up and administering the morgue turned out to be one of cleaning the bodies as best we could and searching for some identification. We would then write a brief description of the body and where it was found, tag the toe, and give the description to the Salvation Army.^{xxxvii}

1958: Springhill Mine Disaster

On October 23, 1958, 74 miners were killed and 100 more trapped but eventually rescued in the No. 2 Colliery in Springhill, Nova Scotia. The event attracted major media attention because the final group of miners was rescued on November 1st, nine days after the explosion. When the bodies were brought to the surface some were identified because miners of the check number – which had been left on the surface and which matched the number on a lamp battery. Others were identified because their bodies were found where it was known they were working. When search parties first entered the mine they would see red blood on the coal so they would mark that with chalk knowing someone had been crushed and buried there. The chalk was important because soon the blood would turn black and no longer be visible against the black coal. Most however, were visually identified by three persons; a physician, Arnold Burden, who had once been a miner; the mine

manager, George Calder; and an official from the union, the United Mine Workers of America, Monson Harrison.

To identify them we used the tag. The number on the lamp would tell us who they were. If they did not have a lamp and we had to identify them, we identified them by knowing them personally. One of the three of us usually knew them personally. We also identified them by whether they had false teeth, any marks on them, the colour of their hair....

Once the body was identified it was released to the local undertaker.

Because of the dramatic rescue after nine days, Burden and some others were flown to New York City to appear on the Ed Sullivan Show. During their absence one body was not identified by the trio but sent on to the morgue where it was identified by a relative. Plans were made for the funeral but then the actual body was discovered in the mine. The body wrongly identified was that of Joe Gerhardt who was wrongly identified as Andrew Bacca. The men were similar in stature and both died in the incident. Gerhardt was wrongly identified by Bacca's brother-in-law. The funeral director went to the Bacca home (bodies were kept in homes for viewing at that time) picked up the casket, took it back to the funeral home, swapped bodies, and returned the casket with the proper body. The whole process took only about an hour. The funeral went on as scheduled the next day. Because the bodies were identified and released so quickly that meant there were a great many funerals to be held at virtually the same time. The local funeral director called for assistance from funeral directors from Oxford, Amherst, Pugwash and Parrsboro.^{xxxviii} He worked it out that there would be five funerals a day with the funerals being planned so they would not overlap at the same church or the same cemetery. However, one local clergyman decided to hold five at once and that meant one day there were 16. The union called to say the funerals were too close together: they could not get from one to the next.

At the last minute, we had a call from the union. We can't get from one funeral to the next to be in time for the next service. We called the first minister said, "Can you shorten your service by 10 minutes?" He said, "Yes, I can do that." We called the second minister and said, "Can you start your service 10 minutes later?" He said, "Yes, I can." That gave the union reps 20 minutes to get from one service to the next.

Because the cemetery staff could not dig graves fast enough some miners were hired as additional grave diggers and paid the going rate for digging graves. The

local funeral homes, A. H. Brown Funeral Services Limited organized all the funerals and assigned and paid the outsider funeral staff that came to assist.

1985: Gander Air Crash – Forensics Return

On December 12, 1985, a chartered aircraft carrying US soldiers from the 101st Airborne crashed in a wooded area close to the end of one of the runways at Gander International Airport in Newfoundland.^{xxxix} Since the crash occurred on federal government (airport) property and there was only one access road to the crash site, the area was quickly controlled. Within minutes, there was an RCMP vehicle acting as an onsite command post and it was linked by radio to an offsite centre in a secure area at the airport.

Initially, those on site had to deal with two problems. First the main part of the aircraft was still burning so firefighters from the Gander volunteer fire department were needed to fight the fire. (Airport fire crews had been there but were needed at the airport so it could legally handle incoming flights.) Second the crash site was littered with weapons and mortar shells. It turned out later that none of the weapons were loaded and the shells were empty souvenirs but in the interests of safety it was decided to have RCMP and Canadian Forces trained personnel remove all of these.

Once that was done RCMP staked out the crash site and began marking and tagging and photographing all bodies and body parts (most of the bodies were intact) and gradually – with the help of military personnel – moving these to a hangar at the airport. There RCMP personnel examined the bodies and using a sophisticated computer data base began to tentatively identify the dead. They were aided by the fact many wore ID tags known in the military as “dog tags”; and by the fact few females were on board and most of these were stewardesses.

While this was going on the US government persuaded the Canadian government to allow it to take over the process of identifying the dead and to do this by shipping all the recovered bodies to the US military morgue in Dover, Delaware. This was made legal by allowing some US physicians to be licensed to practice in Newfoundland and by inviting RCMP observers to Delaware. In Dover, each body, accompanied by a soldier, was moved along an assembly line type process where it was photographed, where dental and other x-rays and fingerprints were taken and where clothing and personal effects were bagged and tagged and where pathologists could look for anything else that might help identify the body and/or contribute to an understanding of why the plane crashed. This post-death data was compared to whatever pre-death data could be obtained, a process made more difficult by the fact the soldiers’ medical records and the duplicates of those records had been on the aircraft.

After all the bodies shipped to Dover were identified it was established one was missing. US military personnel returned to Gander where they sifted and screened the dirt from the crash site and eventually discovered a relatively intact body beneath a tree. Apparently the tree had snapped back when the plane crashed and the body had been thrown under the tree and then concealed as the tree returned to its normal upright position.

1986 and 1987: Hinton and Edmonton -- Forensics if Necessary

In 1986 and 1987 there were two mass death incidents in Alberta. The first occurred when two trains collided near Hinton. The second was the July 31st, 1987, Edmonton tornado. Both led to significant numbers of dead and, in both, though there were some temporary morgues, the bodies were taken to the offices of the medical examiner. Once there, they were identified differently. In 1986, the Hinton victims were identified with the assistance of medical and other records, in other words, using forensics. In 1987, the victims of the tornado were identified almost entirely visually or with the assistance of some personnel effects even when forensic information was readily available.

The Hinton crash on February 8, 1986 killed 23 persons including 16 passengers, the three engineers on both trains and four other railway employees. It tore a passenger car apart, severely damaged the Dome car and – because of spilled diesel fuel – started a fire that severely burned the bodies of some of those killed. A number of the victims were either trapped and/or so badly burned that it took days – and the use of cranes to lift cars^{xi}, bull dozers to them apart^{xii} and blow torches to cut away the roofs^{xiii} -- before police, slowly working their way through the tangled wreckage were able to recover what was left. Two bodies were recovered the day of the wreck, eight more the next day, Sunday.^{xiii} After that it was a slow and laborious process.

In order to recover their bodies, our investigators and the RCMP officers assisting us literally were down on their hands and knees with fine brushes clearing away the debris and recovering the remains and personal effects. We had to sift through approximately 50 tons of grain by hand, and initially recovery attempts were hampered by a fire of diesel oil, grain and sulphur. This was a difficult and painstaking task. The exact location of the human remains and personal belongings were noted and their position in relation to each other was reconstructed in the medical examiner's office to assist in identification. The best analogy I can give you to that process is that of an archaeological reconstruction.^{xiv}

Alberta's medical examiner, John Butt,⁶ told reporters that his office would need medical and dental records to identify a number of the dead. He also said he hoped jewellery on the bodies would help identification and items from the baggage car might help establish who was on the train.^{xlv} He said families of the victims were being asked to assist.

Because there was no adequate passenger list (some persons had boarded at Hinton) police staffed the medical examiner's office so they could take calls from persons who thought someone they knew was on the train. While those answering the phone they used an early version of the yellow Disaster Victim Identification (DVI) form developed by the International Police Criminal Organization (Interpol). The form asks for such information as colour of hair, size and shape of nose, for any scars, tattoos, whether teeth were in good shape, and for information about clothing jewellery, and for information about documents that were found with a body. It also asks the investigator to try to obtain medical and dental x-rays. After Hinton, information about hair colour, size and shape of nose would have been of little value and was not collected but data on clothing and items with the body was obtained and was crucial to the identification of some victims. Some of this information was obtained from family members; some of it – what someone was wearing for example – from the last person to see them before they boarded the train or from a surviving passenger.

RCMP and other police began to track who was on the train and – when that was determined – to collect information that might help identify them. Usually they asked for a photograph, asked about jewellery and asked for the names of their dentists, physicians and about whether they had ever received treatment in hospital. Although one of the first two bodies recovered was visually identified immediately, many bodies were badly burned and could not be identified until *ante mortem* dental, medical x-ray and other records were obtained. Nearly two weeks after the incident, Don McCann, a spokesperson for the provincial Attorney General's department, said an anthropologist had been brought in to assist in the identification of the remaining seven unidentified bodies. McCann said many had no features left. ``in some cases you are dealing with bones, and this anthropologist has experience in reconstructing and identifying skeletal remains. "He declined to name the anthropologist."^{xlvi} Four days after Hinton, Tuesday, February 12, Dr. Butt wrote to Alberta Health Care Insurance asking for a 10-year review of computerized records. Such a request is authorized under section 40 of the *Alberta Hospital and Inquiries Act*. The letter stated:

⁶ Butt moved from Alberta to Nova Scotia and, as a result, was the medical examiner when Swissair 111 crashed into the Atlantic near Peggy's Cove.

This request is made primarily to assist in identification and specifically so that a search may be made of hospital, physician and chiropractic records to learn of x-ray or operative procedures that may assist in comparison with post-mortem remains.

It also asked the assistance of Alberta in obtaining records from other provinces since the act did not empower the medical examiner to seek records outside of Alberta. The request led to prompt action and, before long, records were being obtained not only from Jasper, where several train crew members lived, but from British Columbia, Saskatchewan, Manitoba, even as far east as Ontario and Quebec. Investigators from the medical examiner's office also phoned for information and this too proved invaluable. In one case, though no dental x-rays were available, a phone call established that someone had a full upper denture. In another, it was learned that someone had had a rib fracture though this, too, did not show up on pre-death x-rays.

In most cases both medical and dental records were made available usually at the request of the medical examiner, sometime at the request of the family. The cooperation was especially good in Edmonton. If there was any sign of reluctance, the M.E.'s staff would ask the family to request the records. When some physicians showed reluctance to provide records which showed what they had charged, they were told that information was of no importance. They could blot it out if they wished.

Gradually a complete list of those missing was obtained and work could start on pinning down the identities of the remains now in the morgue. A second body was identified visually by a family member and that identification was confirmed by a bracelet and scars from surgery. It was also possible to identify one body by clothing and other items found on the body. But no other visual identifications were made. Most remains were not in condition to be identified by someone who knew them.

At first, the two most common ways of identifying a victim was a comparison with dental x-rays or a comparison with medical x-rays:

- Identification is made from a comparison of a jaw fragment with a clinical dental x-ray;
- Identification is made by comparison of post-mortem x-rays of the lumbar spine, sacroiliac joints and left foot with clinical x-rays;
- Positive identification was made by x-ray comparison of the lumbar vertebrae and sacroiliac joints with a clinical abdominal x-ray;
- Identification was made by dental comparison;

- Identification was made on the basis of unusual features of dentures and circumstantial evidence – including contents of a wallet;
- Identification was made from dental x-rays.

Fingerprints were obtained for one victim – he had been printed by a previous employer – but these were not used. No attempt was made to find fingerprints by trying to locate something the victim and only the victim had touched.

As one after another victim was identified it became possible to draw inferences about the remains that were left. For one thing, some were male and some were female. When only one male – an older person -- remained unidentified and the remains still unidentified were clearly that of an older male, a decision was made that those were the remains of that person. When all but three women had been identified an anthropologist was able to determine that some remains could not be a certain person. The fact that two victims had dentures and one did not also helped in the elimination. In addition, while it is not possible to tell a precise age from skeletal data but it is possible to distinguish between persons of widely disparate ages. After reviewing the three sets of skeletal remains the anthropologist concluded:

Comparison of the profile of the acetabulum with an X-ray of the pelvis...shows conformity of profile. The profile is sufficiently unusual to be regarded as strong presumptive evidence of identity.

Although this work was done by an anthropologist, the reports were signed by a physician. Although the anthropologist had been involved with the medical examiner on a number of individual cases, this was the first time he had been brought in for a mass death incident. He and some graduate students at the University of Alberta were invited to take part in all the identifications (including the ones where medical and dental records were matched). They played a major role in the cases where there were only skeletal remains some of which were intermingled. When the way they were involved was reviewed, both the deputy medical examiner and the anthropologist agreed it would have been preferable if he had gone to the site to observe the way human remains were collected. However, the collection process had been meticulous and the material collected had been carefully bag and the location where it was discovered carefully recorded.

As a victim's remains were identified the medical examiner's staff would contact the police (in most cases the RCMP) and the police would notify the person identified as Next-of-Kin (N.O.K). It was assumed that person would contact other family members. In accord with the family's wishes the remains

would then be released to a funeral home for funeral services, burial or cremation or, if the family wished, transport to their home community.

The Edmonton Tornado

On Friday, July 31, 1987, 18 months after Hinton, just as evening rush hour was starting, a tornado struck south of Edmonton, then tore apart small business, homes, large firms and house trailers starting in Sherwood Park on the south side, moving into neighbouring Strathcona County and then heading back into Fairview, a middle class housing area before hitting the Evergreen Mobile Home Park in the north-east corner of the city. It left behind damage and destruction, about 400 injured and 27 dead or dying. Most of the dead died on site but three – one at Alberta hospital Edmonton and two at the Royal Alexandra – died after being taken to a hospital.

Many of the dead, especially in the industrial area, were identified both by fellow workers and by the contents of their wallets. In at least one case, a spouse learned of her husband's death and went to the medical examiner's office and identified him before police came to her home to inform her. There was confusion only once. It turned out there were two persons with the same name one of whom was killed at work in the industrial area on the south side, one of whom escaped injury though he lived in the devastated Evergreen Mobile Home Park. Persons who knew the one who lived in the trailer park saw the name on television or heard it on the radio thought he had been killed.

While most of the bodies in the industrial area were located where they died and were photographed by investigators from the medical examiner's staff before being moved to the morgue⁷, the bodies in the trailer park were all moved without any record being kept of where they came from. In an attempt to make up for this, a constable was assigned to interview police and firefighters try to determine where the bodies had been. Other constables photographed and fingerprinted all bodies and went to the location where each had been found to photograph the scene. Each body was tagged with a number. A thumbprint of the deceased was placed on the tag and a further photograph was taken of the body with the tag clearly attached. The temporary morgue processed 13 bodies, the last found at 2:30 a.m. on August 1, the day after the tornado.^{xlvi} At first, police and firefighters took both the injured and dead to the same location – the Happy Pizza and Steak House – but, realizing it was depressing for the injured to see the bodies, moved the bodies to another nearby store.^{xlvi}

⁷ At the time of the tornado the ME's investigators all carried film cameras and as part of their normal procedure took photographs showing where remains were found and of the remains before any bodies were moved. They still do so but their photo equipment is now digital.

Because the number of dead was too great for the morgue, the deputy medical examiner ordered a refrigerated unit to be brought to the trailer park and arranged for all the bodies in the pizza parlour to be moved in one trip. He made that decision after – because communications were in total disarray – he was able to contact his investigators in the industrial area using a citizens' band radio. By then, late Friday evening, the first bodies had arrived at the medical examiner's office and the father of one had arrived to identify his son who was employed by one of the businesses in the south side that was hard hit.^{xlix} He was one of two employees from that firm killed in the tornado. He had died after being pinned under a lathe. Another employee was killed when a wall caved in.¹

Although most of the dead were identified on site, someone who knew the persons who died was invited to view the body at the morgue to confirm the identification. Since, after the tornado the cause of death was obvious, most bodies were released to families within 24 hours. In fact all the victims who died the day of the explosion were identified and checked over and released to family within 36 hours. In one case, a body was not identified immediately because no one of her apparent age was reported missing. Eventually she was identified by a fellow worker. Visual identification was not used in most cases after the Hinton a year earlier because so many bodies had been burned. After the tornado however most bodies were intact. Only one had to be identified by matching medical records with x-rays of the body. The authorities were so confident of the identifications that they declined to use fingerprints to verify identification even though fingerprints were available for four victims.

1982: Ocean Ranger – Visuals Again

On February 15, 1982, the oil rig, *Ocean Ranger*, capsized and sank in the Atlantic Ocean. The 84 men on board made desperate attempts to escape and some did make it to a lifeboat; but given the blowing snow, high winds and waves more than 15 metres high, it proved impossible to launch some life rafts or inflate others. While some contractors had excellent personnel records and immediately contacted all their employees' families, others did not. Some of the less skilled employees lived in boarding houses: often their employer had a name but no address. Staff at the provincial Petroleum Directorate wanted relatives to know of the government's concern; but as noted there were no addresses for some of those on board so a staff member made contact with the various religions and asked that someone be approved to come to the family call centre at Atlantic Place, the building where Mobil's offices were located. Because of the poor records, in some cases all there was to work with was a list of names and a few addresses:

With this incomplete list the church representatives tried to determine from the surname what would most likely be the religious affiliation of each person. The historic settlement patterns of the original settlers, principally England, Ireland and Scotland, and relative isolation of Newfoundland communities enables one to link a surname with a religion fairly accurately, and often with a region. Within a couple of hours, each name had been assigned to one of five categories: Roman Catholic, Anglican, United Church, non-residents and ‘other’, the latter being the responsibility of the Salvation Army representative.^{li}

One of the things that astounded me was that they had the names but I don’t know why they didn’t have the homes of these people. A bunch of emergency clergy – they have a call out – Roman Catholic, Anglican, United, Presbyterian – and I was astounded. I will never forget how these men would hear the names and tell the community they came from and I don’t think they were ever wrong and it was amazing. They really helped out down there and I learned at a young age how important it is to have the right people around you.⁸

Eventually search and rescue ships recovered 22 bodies and brought them into Pier 17 in St. John’s harbour where the provincial works department had set up a morgue. The boats would tie up at the dock and police would unload the bodies trying to keep the faces covered to prevent someone watching to take a visual that would allow someone seeing it to recognise a body. It was not easy and there were many media complaints at the restrictions. Photographers and camera persons for example climbed Signal Hill which towers over the narrow harbour entrance and tried to get visuals of bodies laid out of the decks of the supply ships. Other media told police they would complain to the federal Department of External Affairs about the restrictions on access. The police ignored the complaints. They were sure that the local people would appreciate the controls. In any case, in the high wind and blowing snow police were not always able to keep a body covered. When the covering blew off the face of the first body to be unloaded, a policeman watching recognized a school friend.

Although works employees had created small cubicles with sheets as curtains where bodies could be placed individually, at first they were kept in the main part of the pier warehouse where attempts were made to identify them. Royal Canadian Mounted Police assisted by Royal Newfoundland Constabulary

⁸ All persons who were interviewed for this research were promised anonymity.

photographed all of the bodies and took fingerprints but enough was found on each body to satisfy them who that person was; so that neither the photos nor fingerprints were used. Although some bodies were slightly disfigured most were in good condition because they had been in cold water. Some bodies were identified because they had a wallet or a ring or a distinctive tattoo. Usually someone related but not in the immediate family came to see if they recognized someone -- a cousin or uncle, perhaps.

Finally, a man who had worked on *Ocean Ranger* and knew everyone on board came in to take a look. He tentatively identified the final two bodies that had not been identified. To verify his opinion, an employee of the Petroleum Directorate arranged to have coffee with the family representative from each of those families. As they were chatting he pulled out a medal or a watch taken from the body and in each case they told him immediately they recognized it. That was considered enough. Of the 22 bodies recovered, 16 came from Newfoundland. Others came from Alberta (2), Kentucky, Alabama, South Carolina and Connecticut.

During the same storm, a Russian trawler *Mekhanik Tarasov* had also gone over and bodies from it were also recovered and brought to Pier 17. Most had a distinct appearance, nothing like the men from *Ocean Ranger*. But one was tall, blond and lanky. Concerned that an *Ocean Ranger* body might have been mixed up with a Russian body, the Constabulary arranged for persons from *Ocean Ranger* contractors to come and view the Russian bodies. About 20 of them showed up and they were led, single file, past the Russians. All but one said that none of the bodies worked for their company. However, one company representative thought, perhaps, it was someone he knew; but he wasn't sure. Finally he said, "No," and left. But still uncertain he called and asked to go again and later called for a third visit.

He wasn't sure. I took him to the morgue that night three times and he was immensely tormented. "I don't want anyone of my families," he said, "to discover their son's body had gone to Russia."

The Russians were also photographed and fingerprinted but once someone identified all their bodies as Russian and that was accepted as sufficient. The identities of the dead Russians were not established. However, the Russian consul invited those at the morgue to a cocktail party, explaining it was a traditional way of remembering those who died.

It is not uncommon for bodies to be stored in refrigerated trucks and this possibility was considered in St. John's. However, orders came down from the Attorney General, Gerald Ottenheimer that this was not to happen. All bodies would be moved either in an ambulance or, if one was not available, a hearse and one body would be moved at a time. Those vehicles were used to transport bodies, once they had been identified, to the Health Sciences complex where a pathologist did an autopsy, solely to establish cause of death. While he was working on a body the families were notified to come to the complex and social workers stood by to talk to them. Then the pathologist would come and chat quietly telling them their loved one had died of hypothermia. Then the body was released to the family.

Sixty-two of the 84 on *Ocean Ranger* were not recovered and some relatives were convinced their loved ones might have sheltered in the rig's diving bell. That hope was dashed when the rig was briefly recovered and a search showed no bodies on board. (Although the rig had been checked out while still underwater for the formal inquiry, it was considered too dangerous for anyone to try and enter it. However, when a European company won the contract to recover it, its staff tried to blast their way in. Two divers died as a result and one more died before the recovery operation ended.) Long before that, in fact a little more than a month after the incident the US Coast Guard issued formal certificates of presumption of death to the relatives of the 62 men whose bodies had not been recovered:

The Marine Board of Investigation convened by the Commandant of the United States Coast Guard to inquire into the circumstances surrounding the capsizing and sinking of the MOBIL OFFSHORE DRILLING UNIT OCEAN RANGER, O.N. 615641, in the Atlantic Ocean on 15 February, 1982, took testimony on 22 March, 1982, concerning the identity of all crew members and personnel on OCEAN RANGER at the time of the casualty. In consideration of the evidence available to the Board at this time, the Board finds that [NAME] born [DATE] was on board OCEAN RANGER at the time of the casualty and is missing presumed to be dead. B. T. Bloomquist, Captain, U.S. Coast Guard, Member and Recorder, Marine Board of Investigation.^{lii}

The release which officially established someone as dead was issued five weeks after *Ocean Ranger* capsized.

1985: Air India – Mainly Visual

At 7:14:01 Greenwich Mean Time (GMT) on June 23, 1985, an explosive device went off in the baggage compartment of Air India flight 182 (Kanishka) as it passed about 200 kilometres south of the Republic of Ireland at a height of 9,500 metres. The plane was travelling from Toronto and Montreal to London Heathrow en route to New Delhi, India. Air traffic control at Shannon had been talking to the aircraft then heard the click of a transmit button before the plane disappeared from the radar screen. There was no “Mayday” call.⁹ The tail section of the plane broke off and then the wings and engines detached and fell in a shower of twisted metal in the Atlantic Ocean.

Air traffic control asked other aircraft to contact Air India – none could -- then advised the Irish Navy, Coast Guard and the lifeboat service at Valentia Island. All shipping in the area of 51°N 15°W was alerted. By 9:13 a.m. – just less two hours after the incident – a merchant ship, *Laurentian Voyageur*, en route from Montreal to Dublin, reported that debris and bodies were floating in the water. The wreckage was spread over an area of eight kilometres and there was more than a kilometre and a half of oil slick.

Laurentian Voyageur launched some lifeboats and used these to recover bodies and parts of bodies. Other ships – including *Ali Baba*, *Kongsteift* and *West Atlantic* from Spain, Panama, Russia and Poland as well as the United Kingdom -- and a lifeboat from Ireland’s Valentia Island joined the search as did a Irish Navy vessel and Sea King helicopters from the Royal Air Force and from the US Air Force. (Ireland did not have helicopter rescue aircraft at that time.) The rescue helicopters winched down personnel and winched the bodies up. The Irish navy ship, *Aisling*, from Haul Bowline, the naval base near Cork, directed the search. It used VHF radio to keep in touch with the other vessels and coordinate their activities. For example, it recovered body parts spotted by the Valentia Island lifeboat when its six-person crew was unable to get them over its side. *Aisling* herself launched two 4.3-metre boarding craft to recovered bodies, took them on board, then transferred some to the Royal Air Force Sea King helicopters so they could be flown to the naval base^{liii} but brought in 38 bodies herself.

As it arrived at the naval base, *Aisling*'s crew could see bodies laid out along the quay. They had been placed in Irish Army canvas body wrappers and marked with numbered tags on arrival. Later they were placed in body bags supplied by the Southern Ireland Health Board and the Royal Air Force. None had been previously used and the RAF body bags were certified as free from explosive residue, important when it was suspected the cause of the crash was an IED (Improvised Explosive Device).^{liv}

Although the *Aisling* coordinated operations at sea under the direction of Falmouth Coast Guard, the overall response was run by the Irish Marine Rescue

⁹ Mayday comes from the French `venez m`àider, which literally means, `Come to help me`.

Co-Ordination Centre in Cork. Most bodies and floating wreckage were taken into to Haul Bowline. However, five intact bodies recovered by the lifeboat service were taken to Valentia Island where army vehicles were standing by ready to transport the bodies to Cork. (The lifeboat had gone 160 kilometres to sea and had to refuel at the Skelligs rock lighthouse during its return trip because of the heavy outgoing tide.) From the naval base and from Valentia Island the bodies were eventually moved to the Regional hospital (now known as the Cork County Hospital). That meant they were transported from Cork County, and the jurisdiction of the Cork County coroner to the city of Cork, and the jurisdiction of the coroner from the city. Although autopsies showed that three victims died of drowning – they were still alive when their bodies hit the water – none of the 329 persons (307 passengers and 22 crew members) survived and only 131 identifiable human remains were recovered. (One more was recovered but could not be identified.) Most of the bodies – 123 of the 131 – were recovered by 11 p.m. the day of the incident including 54 women, some of whom were pregnant.^{lv} The helicopters transported most bodies to shore where army personnel and medical personnel stood by. The medical team made a quick examination of each body to make certain there were no signs of life. The bodies were then examined at the airport morgue by George Middleton, an RAF pathologist from nearby Wales.

The number assigned to each body was recorded at Cork airport and maintained until the body was released to avoid the possibility that different participants would use different numbers. As each body arrived at the hospital it – and its number – was assigned to a specific Cork police officer who was to keep track of that body as it went through various procedures such as pathology, dental examination, fingerprinting, radiology and other examinations. Initially the numbers were on cardboard labels but (just as would later happen after the tsunami) these became wet and torn and were replaced with plastic-covered cards attached to a limb with a plastic tie. The bodies were stored in five refrigerated containers – each one more than 12 metres long and capable of holding 30 bodies. The containers were hired by the Southern Health Board. The temperature was kept at five degrees Celsius.^{lvii}

At that time, the 600-bed hospital department of Histopathology had a staff of four consultants and four trainees. Its morgue had storage capacity for nine bodies and there were two necropsy tables. Its staff was augmented by five local pathologists, the RAF pathologist who had been at the temporary morgue and four odontologists. To allow sufficient space, the processing took over the physiotherapy gymnasium and a recreation room in the Psychiatric department. A third room was set aside for the Garda.^{lviii} In addition, the radiology department of the hospital was shut down at two o'clock every day to allow it to use that time to do x-rays of the bodies. Soldiers from the Irish Army assisted with moving the

bodies.^{lviii} This was important because, for example, the X-ray equipment was not on the same floor as the floor where the bodies were being examined.

At the hospital, they each placed in a coffin with a brass plate on it with the number taken from the canvas body wrap. All were laid out in one room. Twenty four were identified fairly quickly.^{lix} The walls of the room were adorned with large wreaths with ribbons of the national colours of India, Canada and the United States. There were bouquets on the caskets yet to be identified.^{lx}

The bodies were examined one by one by a pathologist assisted by an odontologist (forensic dentist) and forensics personnel from the technical section of Garda headquarters in Phoenix Park, Dublin, including a ballistics specialist, who looked for trace evidence of explosives and a fingerprint specialist. Also on the team was a police photographer who took pictures throughout the process of anything the pathologist on each team requested. When a body bag was open, notes were taken of any visible marks then any clothing or jewellery was removed, bagged and marked with the number assigned to that body. Fingerprints were not taken until the pathologist was finished to avoid any accidental contamination of the body. After that the body was taken for X-rays.

At the same time, both the RCMP and the Indian police were trying to acquire ante mortem (pre death data) which might assist with identification. (Many of the bodies had been found either unclothed or with little clothing.^{lxi}) Because, in some cases, dental records were not available and the bodies were disfigured, specialists were brought in from London skilled in matching distorted features on corpses with photographs.

Air India employed Kenyon International Emergency Services Ltd. (the same firm used after *Swissair III* and used by the Australians after the Indian Ocean tsunami) to circulate questionnaires among the relatives. This data – which asked for personal information – could have been used to assist identification. One problem with this process is that many of the children did not have dental work or jewellery or anything else which might assist identification.^{lxii} However, the Garda were not happy with the way this had been done and did interviews with all relatives themselves using the yellow pre-death forms developed by Interpol. Kenyon did use staff from the O'Connor funeral homes in Cork to assist and those persons embalmed the bodies after the examination was finished.^{lxiii} Although most of the bodies were intact the relatives were not allowed to make a visual identification. That was partly because of a concern relatives, in their grief and anxiety to have closure, would be prepared to “recognize” a body. They were however allowed to see a photograph and a number of bodies were tentatively identified in this way. Once this was done they were allowed to see the body and confirm the identification.

Because so many bodies were intact, identification of most bodies went quite quickly. Starting the day after the incident, six medical teams were working

around the clock on post mortems. While this work assisted with identification, there was also a pressing desire to gather forensic evidence which would help determine the cause of the crash and possibly help find and convict those who had placed the device on board. By then it was known that a device placed in baggage on a Canadian Pacific flight has exploded on the tarmac and killed two airport staff and injured four others at Narita airport in Tokyo. The medical teams were led by Irish state pathologist John Harbison and Cork regional hospital pathologist Cumine Doyle.^{lxiv} It turned out that most of the bodies recovered came from the first class and business class sections at the front of the aircraft, rather than nearer the back where the explosion is thought to have occurred. This mean most bodies x-rayed had no signs of shrapnel which would have been expected to have lodged in the bodies after an explosion.^{lxv}

As the bodies were processed the Garda (which had an office at the hospital) kept track of all the information acquired for each body, always recording that data beside the original number assigned on the quay. The data included estimated age and prominent identifying features as well as sex. Once a body had been tentatively identified the name and home address was added.^{lxvi} In most cases once the Garda was satisfied a body had been identified they allow next-of-kin to see it. But that was done only after one or two or more other forms of identification had been done. The most common secondary source was jewellery as many of the victims had been wearing distinctive jewellery, sometimes with initials and this had remained with their bodies. The most important forensic source was dental records: 45 of the 131 victims were identified at least in part by dental records obtained by the RCMP and matched by records based on an examination of the bodies.

Each day, as the processing shut down, Garda fingerprint specialists tried to match the detailed prints taken from the body with prints, sometimes just thumb prints, acquired from the RCMP. All prints – both those taken from the bodies and those from Canada – were of high quality and matches were obtained. (The process was improved using techniques developed by an RCMP fingerprint specialist who had worked out ways of distinguishing marks along ridges and from pores.) Each night, as well, an odontologist (forensic dentist) from Dublin studied dental charts looking for matches.

In contrast to dental records, fingerprints were considered important in only five cases – but four of those were crucial. Twice fingerprints showed that a body had been tentatively incorrectly identified. Those bodies had not been shown to relatives; so that led only to an internal adjustment. However in one case the body had not only been identified it had been shown to relatives who confirmed that identification, perhaps anxious to have closure. Senior Garda officers had to sit down with that family and tell them that there was no doubt whatsoever an

error had been made. Then considerable checking had to be done to make certain that the body was properly identified before it was shown to another family. The last person to be identified was a girl. RCMP at the request of the Garda went to the apartment where she had lived – her entire family had died in the crash – and located her fingerprints. Those provided a clear match. The Garda and RCMP worked smoothly together throughout the response and subsequent investigation and there is a plaque in the lobby of Garda headquarters in Cork from the RCMP thanking the Garda.

By July 4th, 11 days after the incident, 90 of the 131 had been identified. By then there were 80 Garda (Irish police) at the hospital working on such things as matching fingerprints and trying to get further information from relatives (who had been flown in by Air India) to assist in identification. Some bodies were marked as tentatively identified so police could concentrate on getting additional information and make a tentative identification definite.^{lxvii} Although the relatives were eventually allowed to come to Cork, they were held back en route in London where they were looked after by the Indian Embassy and members of the Indian community there. However, families in Cork had volunteered to welcome them into their homes.^{lxviii}

When the relatives did arrive in Cork, they were interviewed and information taken from them was recorded on the standard Interpol Disaster Victim Identification (DVI) yellow forms. At that time, forms had to be obtained. Now the latest version of the DVI forms is available on line and can be quickly downloaded. Many relatives had arrived without medical or dental records of those missing or even photographs. It was felt when the process was reviewed they should have been contacted at home before they left for Ireland.^{lxix} Another problem was that many of those arrived had not seen the missing persons for several years: they were therefore of little help when shown photos of the person believed to be their relation.^{lxx}

Religious beliefs also hampered the identification of the victims. An officer of the Garda told a news conference there had been, “Strong objections to the taking of photographs of corpses (which) made it difficult to confirm identifications.” He said, “Indian culture and religious rules regard photographs even of coffins containing their dead, as offensive.” In fact, he added, some relatives felt it offensive that a coffin was used.^{lxxi} Despite these problems all but one of the 132 bodies was identified. Once the bodies were released, the relatives made arrangements for what was to be done next: these were worked out with Kenyon’s, which had a contract with Air India.

In their review of the response, two Cork pathologists, Cumine Doyle and Margot Bolster concluded a conveyor type process is needed – with the bodies moving in an orderly way from X-ray to dental charting, fingerprinting to necropsy and embalming. They added: “A small but absolutely vital part of the

organization is to that body number labels are firmly attached, that one number only per body is used and that the labels are waterproof.^{lxxii} This last recommendation if followed would have saved a great many problems in Thailand after the tsunami where the labels became wet, blurred and unreadable or simply fell off. Doyle and Bolster also stated:

Running water...adequate lighting and ventilation are absolute necessities. Also the facilities should be all on one level, remembering the work involved in moving 9-12 stone (57 to 76 kilogram) bodies. Adequate X-ray facilities should also be available on site.^{lxxiii}

1998: Swissair 111 – Forensics Only

When Swissair 111 crashed into the Atlantic Ocean near Peggy's Cove, Nova Scotia, the initial response was by fishing boats, hoping to find survivors. Soon it was apparent that all they would find was human and aircraft debris. At first, some debris was brought to shore but soon the search was directed by *HMCS Halifax*, a Canadian Navy frigate which contacted the boats by radio, lined them up in search patterns and told them to bring what they found to the ship. It then arranged for the human remains to be taken to Canadian Forces Base Shearwater. At the base, the floor had been marked so that each body could be laid out on a specific space. Instead, the responders, under the direction of Nova Scotia's medical examiner, found themselves dealing with one relatively intact body and thousands of pieces of human remains. Gradually, they began to work on those body parts so they could match what they had with re-death data most of it obtained with the assistance of Swiss, French and US authorities though many of the DNA samples were obtained from relatives of the dead who had flown into Halifax and were staying at the Lord Nelson Hotel.¹⁰ Eventually 147 of the 228 dead were identified by fingerprint, dental records, and X-ray comparisons. The remaining 81 were identified through DNA. (Since two of the dead were twins, it was necessary to find matching body parts to prove that two persons with identical DNA had been on board.)

The relatives were told that they could have a body part once someone had been identified or wait until the identification process was over and then have all the parts of their relative that had been identified. (Since there was no way to tell where a body part came from inevitably some persons were identified more than

¹⁰ The victims came from 28 different countries but 111 were Americans, 44 were French, 41 were Swiss. There were three Canadians plus one person who had dual citizenship – Canada and Morocco.

once.) Once everyone had been identified, the remaining unidentified human remains were buried in a mass grave as were some subsequent human remains recovered when suction was used to clean the ocean floor in the area of the crash. Throughout the process the relatives were given daily briefings even shown some video that had been shot of wreckage on the ocean floor before that video was released.

When human remains were released they were handed by Kenyon's which had a contrast with Swissair. That meant that only one Halifax area funeral home was involved since it had a contractual agreement with Kenyon. Since it took time to collect ante mortem (pre death) data and time to match this AM data with post mortem (post death) death, there was only a steady flow of human remains being released.

2004: Indian Ocean Tsunami – Visual then Forensics^{lxxiv}

In the wake of the Indian Ocean tsunami, bodies were collected by survivors and taken in some cases to hospitals but mainly to Buddhist temples in Thailand and Mosques in Sri Lanka. There they were laid out in rows, photographed and numbered and the photos showing the numbers were posted. Those who believed they recognized a body were allowed to come and see it and it was released to them if they identified it. In some cases, those bodies were almost immediately cremated so there was no way of checking subsequently that the visual identification was accurate. In two cases, however, the identified bodies were shipped to England where they were examined by the West London coroner. It turned out both had been mis-identified. Later, it was established one was German and one was Swiss.

Soon scores of police and forensic scientists began arriving in Thailand and set about trying to locate and identify their own dead and, in some cases, assisting survivors to find the bodies of their loved ones. The Israeli response team, for example, identified a Canadian with assistance from the RCMP and Hong Kong police and identified a South Africa when his brother produced a driver's license which included a thumb print. Within a few days however these independent actions ceased and multi-national agreements were worked out: all the foreign police and forensic scientists would work together and try to identify all the dead. Their results would be reviewed and only three criteria accepted: fingerprints, dental records of DNA. All decisions would have to be approved by the police in Thailand and the coroner in Sri Lanka.

In Thailand, initially, the teams worked in the open but eventually a Norwegian firm, whose officials had been watching what was happening on television, created a state of the art morgue. Since most of the bodies were intact, it proved relatively easy to gather post-death data but there were problems with gathering pre-death data especially when it turned out that it was difficult to

match pre and post death DNA. Eventually refrigeration units were obtained and the bodies were stored in these units: most of the dead were identified from dental records and fingerprints. Since no bodies had been buried, the foreigners worked on all the dead, including the dead Thais. Once the Thai police had confirmed identification the bodies were released to relatives and normally shipped to their home country: the arrangements were made by Kenyon's, which had a contract with the Australian government.

In Sri Lanka, though some bodies had been identified visually, most were not and these were buried, often in mass graves. However, some foreign bodies were shipped to Colombo and others were buried in separate graves. British, German and Austrian police found persons who knew where foreign bodies were buried then took this information to the Sri Lanka police who went to court to seek exhumation orders. Once those were granted the bodies in those graves were exhumed and in every case at least one foreign body was discovered. Those bodies were then taken to the hospital morgue in Colombo where identification was done fairly quickly because it was known whose body was believed to have been recovered and because the Sri Lankan coroner was working with the identification teams and could give approval on the spot.

Most of the problems in identification in both Thailand and Sri Lanka resulted from the difficulty of getting adequate pre-death forensic material. That was partly because in some countries it was not understood that data obtained from a body was not sufficient for identification: it had to be matched with pre-death data. It was also partly because there was too much reliance on DNA and it was partly because some of the dead were siblings and some were very young making personal pre-death data hard to locate. In one case, a child was identified after a police officer located some finger painting the child had done in a pre-school setting. Canadian pre-death data was gathered by local police and coordinated by the RCMP in Vancouver where officers had considerable experience with DVI because of the pig farm murders.

Morgues

After a mass death incident there is rarely sufficient space in existing morgues of funeral establishments to hold the bodies so temporary morgues are set up. After a mine incident, often one of the mine buildings is set up as a morgue. But morgues have also been set up in Armouries, unused hangars at airports and military bases, hockey rinks, school basements, a town hall, a movie theatre, an empty store, a pizza parlour and – as mentioned – a miner's hall. Bodies have also been taken to a church hall:

The present stately St. Agnes parish church was only under construction at the time of the explosion and church services were held in the present day parish hall which was then located within a few hundred feet of the No. 12 bankhead. It was a temporary morgue where the bodies of the dead miners – some as young as 13 and 14 years old – were laid out for identification.^{lxxv}

After an avalanche swept over and killed more than 60 workers in the Rogers' Pass in 1910, the bodies of foreign workers were laid out in the undertaking parlours of R. Howson and Company in Vancouver. Others were handled by another funeral home, Armstrong & Edwards. A committee of citizens and the fraternal organizations was formed to look after the burial of the men and make provisions for identification as far as possible.^{lxxvi} In 1916, after forest fires killed hundreds of persons in Northern Ontario, one small morgue was set up at McNabb's funeral home in Cobalt. The main morgue was in Matheson where two tents were used to handle bodies. There were piles of coffins beside the tents, some labelled "full" and others labelled "empty". Soldiers collected bodies of humans and horses and brought the human bodies to the tent morgues.^{lxxvii}

Local Armouries were used after a mine disaster in Springhill and an air crash in Moose Jaw. The O'Brien theatre (which is close to the CPR station) was used in Almonte, Ontario after a train wreck in 1942. At one point there were also 30 bodies in the basement of the Almonte town hall. A hangar was used after the Arrow air crash at Gander in 1985. A hangar at Shearwater naval base was used after the crash of Swissair 111. A hockey rink – the Memorial Arena – was used after 24 persons were killed in an Air Ontario crash in Dryden in 1989. However the bodies were then taken from it by truck to Thunder Bay (the runway at Dryden was too slippery to allow a cargo plane to land) and then shipped to Toronto by air for forensic examination.^{lxxviii}

When soldiers en route to Korea were killed in a train wreck at Canoe River, an undamaged car on the train was turned into a morgue. One surviving soldier, Bombardier B. M. Roberts had been a morgue attendant in civilian life. He was put in charge of the morgue car. Roberts had served in Sicily and Italy during World War II and had volunteered for the special unit recruited to serve in Korea. After the wreck he had organized rescue parties and had retrieved a number of bodies.^{lxxix} Shortly after the incident a special train carrying the wounded and the dead set out the 480 kilometre trip to Edmonton. Four injured died before the hospital train reached Jasper. Two more died between Jasper and Edmonton.^{lxxx}

After the air collision over Moose Jaw, Saskatchewan, the bodies which had been scattered along the fairways of the Willowdale Golf Course were picked up and laid out on stretchers on the floor of the Moose Jaw Armouries. Each was

covered with a red blanket and a baggage tag was used to indicate whether a body had been identified.^{lxxxii} After Hurricane Hazel, the first bodies to be recovered in the Etobicoke area were removed to the Humber Heights School and examined by coroners. Later Saturday night more recovered bodies were brought to the Islington fire hall which was also temporarily designated a morgue for the flood victims.^{lxxxii}

After the 1970 Woodbridge air crash, the Woodbridge arena was turned into a morgue. Since the crash occurred in early July, the arena was not in use as a skating rink so the ice making equipment had to be turned on. The arena was closed off to next-of-kin while Ontario Provincial Police, pathologists, odontologists and document experts began to examine the bodies. The bodies were moved from the crash site to the morgue in two refrigerated trucks and in a Canadian Forces helicopter. Bodies identified as members of the air crew were dealt with separately at Peel Regional Hospital.^{lxxxiii} In 1992, after the Westray mine incident in Plymouth in Pictou County, Nova Scotia, plans were made to turn St. George's Church Hall into a morgue but the decision was made to use the New Glasgow stadium instead. At the stadium, a team of physicians and nurses did autopsies on the bodies working under the supervision of Nova Scotia's chief coroner, Roland Perry.^{lxxxiv}

Release of Names

Even before many or even most of the dead after been identified, names of those missing and, sometimes, those injured are made public. For example, after the train crash in Canoe River in November, 1950, the Department of National Defence quickly released not only the names of the dead but also a list of those who were injured. The lists included the home towns of all the soldiers who were injured, killed or still missing presumed killed.^{lxxxv} Similarly, after the crash of Swissair 111 the airline released the names and nationalities of all those on board. As a result, it was possible to see that there were three Canadians on board, one of them a dual citizen of Morocco. Names of the missing presumed dead were also released very quickly after mine incidents though that took a little longer in Springhill in 1891 because many of the survivors rushed home to tell their families they were all right instead of checking out.^{lxxxvi}

It is fairly easy to provide names after a mine disaster because there is a record of who was in the mine or after an air crash since passenger lists are fairly reliable. However, it is far more difficult after a widespread destructive incident such as the 2004 Indian Ocean tsunami. Then foreign ministers and police have to depend on persons to report that someone is missing and to verify those reports. This can take considerable time and there are often problems.^{lxxxvii}

This custom – the release of names of those involved in a mass death incident – appears to have been normal for all the incidents studied until very recently. It was done, for example, after every mining incident and after every air crash and it was done after the fire on the cruise ship, *Noronic* and after the loss of the *Meteor* off Alaska. It was not done however after the 2004 Indian Ocean tsunami when the Foreign Affairs department announced it would respect the privacy of the victims and their families. However, the Toronto *Daily Star* did publish a list of names. The paper's editor-in-chief Giles Gherson said the newspaper was printing the names as a matter of “overwhelming public interest.” “We believe ... the information should flow freely so relatives or friends in Canada can tell the authorities if they know someone on the missing list is, in fact, safe.” When other countries did publish lists of those reported missing, this is, in fact, what happened: after Denmark published its list of missing, two thirds of the names were eliminated in less than a day. Most of those were cleared by calls from persons who were unaware they had been reported missing. Australia had the same policy as Canada and was considering revising its privacy legislation as a result of its tsunami experience.

Until recently such lists often tended to include not just names and nationalities (and, sometimes, occupation) but also some racial identification. For example, after the avalanche in Rogers Pass, the list of dead named the various train crews and their occupation – there was one conductor, two engineers and one firemen killed – did not identify the 27 men who were Japanese, simply listing them as the dead number 25 to 61 -- “Thirty-seven Japs”.^{lxxxviii} The names of the Japanese *were* released later. Similarly after the 1912 Regina tornado and the 1917 Halifax explosion non-Caucasians were listed different. In Regina, a list of the dead published in the Saskatoon *Star-Phoenix* included: James Scott, Customs House; James J. Bryan, manager, Tudhope and Anderson; Infant child of Clarence Loggie; and “Three Chinamen, names unknown” A later report did list one of the Chinese as Ye Wing and a fourth Chinese victim as Ywe Boyuen. The list of the dead in Halifax did not include first names for some black victims.^{lxxxix} There were somewhat comparable references after the Hillcrest mine disaster. One report said that probably the largest share of the dead is Canadians. Then it went on to say there were about 20 French and Belgians...and a few Americans and Slavs.^{xc} Ethnicity was also mentioned on occasion when there were funeral services, for example after the mine explosion in Springhill in 1891:

The funeral services were completed yesterday afternoon, when a Greek orthodox ceremony and a combined Protestant service for Salvationists, Presbyterians and Methodists were held in the Presbyterian Church at Scotchtown. The orthodox service was sung in Russian by a male choir.

At the Catholic Church in the morning a small inkling could be seen of the cosmopolitan population of the mining town when the relatives of the deceased men entered the church. First, the Italian women, with black mantilla lace; then the Russian, with their burning candles; the Belgians with snowy kerchiefs and colored shawls; English, Scottish and Irish, and even the Jewish element was represented in the congregation, all honouring the dead.

A pathetic incident was the burial of foreigners who had no relatives here at all. All were buried in one grave and around it the people gathered, not curiously, but as if to take away the lonely feeling.^{xci}

By 1965, however, when an avalanche occurred at Granduc, while the names of all those involved was again released, the list included names and (where these were available) home towns. Nationality was not indicated not was race.^{xcii} Race has not been mentioned in other recent incidents.

Summary and Conclusions

Canadian planning for a mass death incident is based on the general plan developed by the International Police Criminal Organization (Interpol), which is known as the *Interpol Disaster Victim Identification Guide*.^{xciii} Although the plan has been continually revised as have the Interpol yellow and pink forms for gathering pre-death and post-death information, the Interpol plan assumes that a disaster will occur at a site and that though the initial response may have been informal it is critical that police take charge of that site:

It may be preferable, or indeed the only option, to establish a command post at the scene, in a tent, suitable building or police command vehicle which has the necessary communications systems or can rapidly be equipped with them. In such cases the post should be sited at the most convenient entry or exit point on the perimeter of the scene.

Total site security is essential to allow the rescue operations to proceed without interruption, to protect evidence and to protect the public from danger. It may be necessary to fence the site or otherwise clearly demarcate it, and there will be a need for round-the-clock uniformed guards. From the moment a perimeter and

entry/exit point have been established, the Scene Co-ordinator must ensure that a personnel check point is also established to log details (name, organization, date and time) of all persons entering and leaving the site. Civilian volunteers and other unofficial personnel present, if of value to the operation, should be listed, organized and given specific tasks under the control and direction of one of the emergency services. Any unauthorized persons not required should be asked to leave the site although, as potential witnesses, their names and addresses should be recorded.^{xciv}

This plan does work at an incident such as the 1985 Gander crash where there was a site, was only one access road and the police were first to arrive on the scene. It also works fairly well when the incident has occurred in a limited area and police arrive very quickly (*Noronic* fire, Hinton). It does not work where human remains are scattered about in the ocean (*Princess Sophia*, *Ocean Ranger*, *Air India*, *Swissair III*) or on the ground (Halifax explosion, Moose Jaw crash, Edmonton tornado, the tsunami), especially when most of the dead are collected by private citizens and brought to various public buildings such as schools, hospitals and temples. The authorities may eventually take control of human remains but this will not happen immediately and it may happen, as was true in the tsunami, after some bodies been visually identified and released and even cremated.

While these case studies show that the standard police mass death plan has its limitations, they also show that the pattern of dealing with the dead after a mass death disaster has changed over time. What was once initially done relatively informally – bodies were recovered by civilians and/or fellow workers – still happens but what was also done informally – bodies were identified by fellow workers and/or family is less common.

Surprisingly perhaps these changes and the development of sophisticated forensic techniques have not meant that these techniques will be used or that bodies will not be identified visually. Even when identification is controlled by the medical examiner or coroner, visual identification is still used. It was used after Hurricane Hazel and after *Air India* and after the tsunami. More significant, it was used in Alberta after the tornado even though a year earlier the medical examiner had made extensive use of forensic data and even though fingerprints were already available for four of the victims. Initially it appeared that forensic had arrived with *Noronic* and that forensics were the only way to go after *Swissair III*. That now seems much less clear. At least for now it appears that it is forensics if necessary but not necessarily forensics.

Another pattern is however much clearer. The authorities take control of the dead as soon as possible after a mass death incident. If the incident occurs on a controllable site --- as was the case at Gander and Hinton – they take control immediately. If the incident is widespread – as was true Moose Jaw and in Edmonton – they take control of the bodies as soon as that is physically possible. Even when bodies are picked up at sea – as was true for *Ocean Ranger*, *Air India* and *Swissair III* – it is not long before the informal responders, such as fishing boats, are being told where to take human remains and the bodies and body parts are being transported to a secure location.

As mentioned at the start, these conclusions have one caveat – forensic techniques may be more widely used, even when visual identification appears possible, if there is a need to gather evidence. After the terrorist attacks on London transport, for example, bodies from the four different locations were taken to the same temporary morgue but were kept separated to avoid forensic cross contamination. Similarly, the bodies from Air India were examined to see if they could help determine what had happened and – when it became clear there had been an explosion – where the explosion occurred. While these concerns affected the use of forensics they did not mean that bodies were not identified visually. As far as identification was concerned, it was still forensics if necessary.

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