



One Hundred Years of Progress

Edited by

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Safety in Science and Science Education

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ONE HUNDRED YEARS OF PROGRESS

(May 16, 2012)

Since 1973, I've been collecting anecdotal accounts of lab accidents. The collection now includes more than 5,000 examples of what happens when you break the rules. The first 1,500 have been published by LSI in a three volume series, *Learning By Accident*. In this compilation, I've included the most serious accident report for each of the last seventy years. I hope you'll find them to be an instructive and graphic reminder of the need for continued vigilance and understanding. ... Jim Kaufman

2012 Five students and a teacher are injured at a Wisconsin High School near Madison in an alcohol fire during a flame test demonstration.

A lab worker in Germany died from accidental exposure to trimethylsilyldiazomethane.

A teacher and three students are recovering from burns suffered in a small explosion and fire during a science class demonstration at their suburban Syracuse school in the Liverpool Central School District.

Five students and a chemistry lab technician are in good condition after a chemical explosion on the SC State University campus. The technician was transported to the Reg. Med. Center for injuries to her forearm. The students were transported to the hospital for observation after being exposed to fumes during the evacuation process

A 25 year-old San Francisco VA Hospital lab worker died in April from exposure to a deadly bacteria at the Northern California Institute for Research and Education. He was working with a bacterial strain that causes septicemia and meningitis.

2011 A solvent fire destroyed the Discovery Laboratory at the Indian Institute of Chemical Technology (IICT) in Hyderabad, India.

A 38 year-old biotechnology teacher, Nimala, dropped a bottle of alcohol while using a burner. She died from her injuries.

A 22 year-old senior, Michele Dufault, was killed at Yale University when she got her hair caught in the chemistry department shop lathe at 2 AM.

A contractor, Dr. Nanaj Bhamare died following a lab explosion at Aberdeen Proving Ground, Maryland.

Apr 29, 2011 (CIDRAP News) – The US Centers for Disease Control and Prevention (CDC) said yesterday that it and public health partners in several states are investigating a *Salmonella* Typhimurium outbreak linked to lab exposure that has so far sickened 73 people in 35 states (and caused one death).

An explosion in the UC Berkley Chemical Engineering Department on Monday, May 16th sent one 23 year-old student to the hospital with moderate injuries.

Adrian Martin was killed and a colleague injured in a methane explosion at Membrane Technology and Research in Menlo Park, CA on Friday, September 2nd.

2010 A graduate student at Texas Tech in Lubbock lost three fingers and puncture an eye when the highly reactive material he was working with exploded.

Seven scrapyard workers, unaware that the University of Delhi research Gamma cell 200 irradiator they were dismantling contained cobalt-60 fell ill; one, Rajendra Yadav, 35, died. The 3500 kg device had been imported in 1965 and had remained unused since 1985 was sold at auction to the scrap dealer.

Tyson Larson, a 28-year old inventor died in a hydrogen explosion at Realm Industries, an alternative fuel research company in. Sumi Valley, CA.

2009 In January, the UCLA research technician died from the burns sustained in the accident.

A researcher at the University of Chicago Medical Center, Malcolm J. Casadaban, 60, died from exposure to *Yersenia Pestis*, a plague related bacterium.

Richard J. Folaron was killed and another injured in an explosion at the DuPont facility in Tonawanda, New York.

A worker was electrocuted in March in a lab at the Army Research Laboratory in Adelphi, Maryland.

2008 In December, a research technician, Sheharbano Sangji, at the University of California in Los Angeles was badly burned when pyrophoric t-butyl lithium sprayed from a syringe.

Windsor Pharmaceutical lab worker dies after exposure to toxic chemical. The hood had been turned off due to roof construction. Ronald Daigle was the 46-year old chemist. The chemical was trimethylsilyldiazomethane.

Jason Siddell, a 24-year-old chemist based in New Jersey, died after being exposed to the compound during his work on Jan. 4, 2008. The medical examiner's report completed on Jan. 9, done with the assistance of a forensic pathologist, states he died due to "complications of a diazomethane compound exposure." The report says Siddell had "massive" pulmonary edema, a build up of fluids in his lungs. Paul Siddell said in an interview that his son had dropped a container of the Trimethylsilyl Diazomethane and it spilled on his clothing. He said his son died in hospital several hours after his exposure.

2007 Explosion at T2 Laboratories in Jacksonville, Florida killed Parrish Lamar Ashley, 36, Charles Budds Bolchoz, 48, Robert Scott Gallagher, 49, Karey Renard Henry, 35, and injured 35 others.

2006 Six students and the teacher were injured at Western Reserve Academy in January when a flame test demo exploded. Two students were reportedly burned over 40-50% of their bodies.

A cylinder of liquefied nitrogen gas exploded in the Chemistry Department of Texas A&M University (College Station). The cylinder went through the ceiling into the penthouse. Damage is estimated at over one million dollars.

Nancy, France - A large explosion rocked a university's chemistry department in eastern France on Friday, killing a professor who was blown through the ceiling and seriously injuring a student, authorities said.

2005 A student was injured in an explosion at Randolph Macon College. She went in to check the sample. It had evaporated and exploded.

Washington, DC Cardozo High School was evacuated and closed following a mercury spill. A spill in 2003 at Ballou High School cost over \$1,000,000 to clean up.

Two Huntington Beach High School (California) seniors were badly burned on the last day of school attempting to perform a demonstration involving methanol. One was burned over 40% of his body.

A biology professor died at Cleveland State University following an electric shock in the lab.

A Texas A&M graduate student died by drowning on a department field trip/activity.

A geological engineering student, Kenton Joel Carnegie, at University of Waterloo in Canada, died in November from a wolf attack while doing field work in the Athabasca basin.

2004 Four students and a chemistry teacher at Federal Way High School in Tacoma, Washington were burned when the methanol in the flame test demo exploded.

Nine students were injured at a high school in Cobb County Georgia high school science class. A demonstration involving methanol exploded.

A lab fire at Ohio State University's Chemistry Department destroyed one lab completely and another partially (04/08/05). Solvent was being loaded into a flammables cabinet when the shelf collapsed. It was an improvised Justrite shelf in an Eagle cabinet. Damage is estimated at several hundred thousand dollars.

A Russian researcher has died after sticking herself with a needle containing the deadly Ebola virus. The accident occurred on May 5 when Antonina Presnyakova was conducting research on Ebola, a virus for which no vaccine or remedy exists, for the Vektor State Research Centre of Virology and Biotechnology outside Novosibirsk in central Siberia.

In St. Paul, Minnesota at the Vet Tech Hospital, an employee was trapped inside steam washer used to clean animal cages while the washer was in the final rinse cycle. The employee could not open the door from the inside, could not stop the washer, and was fatally burned.

2003 A Canadian graduate student lost the sight in one eye as the result of a picosecond exposure to a laser beam.

An explosion in an industrial lab in Rochester, NY resulted in the death of on lab worker.

Jason Mulder, a University of Minnesota (Minneapolis) Department of Chemistry graduate student, suffered burned arms and legs in an ether fire. A bottle spilled in a hood near a heat source. He spent one-half year in recovery before being able to finish his degree.

West Valley City, UT -- A renowned forensic investigator died late Thursday after a rifle he was examining discharged, shooting him in the chest. Scott R. Spjut, director of the police department's Forensic Services Unit, was looking for fingerprints on the semiautomatic weapon around 4 p.m. when it fired.

Manhattan, KS -- Ranjit Koodali, a postdoctoral fellow at Kansas State University, suffered second-degree burns in a chemical fire around 8:40 a.m. today in a third-floor laboratory in K-State's Chem/Biochem Building.

2002 A Tulsa, OK student at Bishop Kelly High School was taken to the hospital for emergency surgery. His thumb was blown off when his teacher asked him to help grind a potassium chlorate/sulfur mixture.

A tenured, organic chemistry professor was fired at the University of Texas in San Antonio. The State's Board of Regents voted 8-0 to terminate him because of alleged unsafe practices.

A Minnesota college junior was burned over 50% of his body in an explosion that occurred while cleaning up a distillation residue.

Two students in the Chemistry Department of the University of Minnesota were injured in an explosion of tetrahydrofuran (THF).

2001 Five high school students in Galesburg, Illinois were injured and two required eye surgery when the ethanol/methylene blue solutions they were distilling exploded. None were wearing eye protection. Settlement was reached in 2005.

Forty-three school children were killed in China when the fireworks they were making at their school exploded. Fireworks manufacture was a required school activity.

A chemistry professor, Michal Wilgocki was killed in Warclaw, Poland when his research experiment exploded. Three laboratories were destroyed in the explosion (260g ethylenediamine perchlorate) at the University of Warclaw.

An explosion in a lab at the University of Connecticut shattered a student's ear drum.

A fire in the UC Irvine Chemistry Department does over ten million dollars in damage.

A microbiologist died of suffocation at CSIRO in Australia in December 2001 because of a liquid nitrogen leak in a cold room. Australian Animal Health Laboratory.

2000 Ohio Wesleyan University undergraduate underwent four hours of surgery to remove glass from her face. Her organic experiment exploded when the lab tech mistakenly filled dropping bottles with perchloric acid instead of phosphoric.

Thirty-three middle school students were injured in Hyrum, Utah when the "Woosh Bottle" demonstration exploded in a large glass container.

Several students were injured at the Saint Albans School in Washington, DC and Riverside, California science classrooms when the flame test demonstration exploded.

A lab worker died and five were injured at Columbia University Medical School when a liquid nitrogen line used for an MRI developed a leak.

A 14 year-old boy at Dunsmuir Middle School (Victoria, BC) suffered broken bones and nerve and tendon damage when a sulfur and potassium chlorate mixture exploded during a class experiment.

1999 A Scottish hospital lab worker died in Edinburgh from nitrogen inhalation from vaporization of liquid nitrogen. Seven hundred liters leaked into the laboratory. Three others were injured in the incident.

Bakersfield (California) High School Students were seriously injured when a "Woosh Bottle" methanol ignition demo exploded.

A Battle Creek Michigan High School Student was badly burned when a chemistry class demonstration exploded.

An employee from Agat Laboratories (Edmonton, Canada) was opening a chamber used to clean cores with toluene. Once the chamber was opened, toluene vapors overcame the employee who died of toluene exposure.

1998 Lansing Waverly High School (Michigan) Student was burned over 50% of her body when the teacher's "methanol cannon" demonstration exploded.

A southern California high school senior was badly burned when the "Potato Cannon" experiment he was conducting exploded on the school football field. He was hospitalized for 40 days and fitted for a mask when released.

A student at Xavier University was working unsupervised in a Chemistry lab without goggles. She splashed acid in her eye and lost partial sight in that eye.

Queens University Geology Assistant Professor Julian Michael Szeicz died in April in an avalanche while collecting field samples for doctoral students.

1997 Dartmouth College Chemistry Professor, Karen Wetterhahn, died in June after spending several months in a coma following overexposure to dimethylmercury.

Elizabeth Griffin, 22, died six weeks after a rhesus Monkey threw feces, saliva, bedding or urine in her eye. The monkey had herpes-b virus. She was not wearing eye protection.

A 17-year-old was electrocuted during a 1997 classroom science experiment in the 3,600-student Franklin County, Ga., school district. The experiment involved stringing a wire around the classroom and cutting away insulation at several points so students could attach probes from a volt meter to learn how to measure electricity.

1996 An acetylene tank leaked in a Florida petroleum research lab. The acetylene ignited and Ray Rudelis died from burns sustained in the fire.

A student at RPI in Schenectady, NY died three months after sustaining serious burns when an oily apron and his clothes ignited while using a plasma cutter.

A New York City sanitation worker died of toxic fumes released when a corrosive acid (Hydrofluoric) blew up in the back of his truck

A post-doctoral fellow was blinded at the Harvard Medical School when she poured concentrated nitric acid into a beaker containing alcohol. She thought it was water.

1995 A graduate student at the University of Hong Kong died following prolonged exposure to an unreported spill by a Ph.D. research scientist.

A student at Heidelberg High School (Germany) made an unsuccessful attempt to commit suicide with a chemical stolen from the chemistry lab.

Janitor in Northwest Washington suffered from mercury poisoning following clean up of a 300 ml spill using a standard vacuum cleaner.

A University of California at San Diego undergraduate Biology major died doing field work. While living in a cabin to collect flower samples, she live-trapped mice and contracted hantavirus.

1994 A physics teacher in Denver, Colorado injured five students and blew off his hand performing a thermite demonstration for his class.

In the Sterling Winthrop Pharmaceutical R&D labs in Collegeville, PA, a maintenance worker was fixing electrical fixtures and thought that the power was off. It was not. He died.

A lab technician at Palynolab Resources Pty. Ltd in Western Australia died from burns sustained when he spilled concentrated hydrofluoric acid on himself.

1993 A professor at Idaho State University was cleaning up unlabeled bottles left from graduate work that lost funding. One container exploded, resulting in loss of his thumb.

Dennis Park (25 years old) was killed at Thiokol in Elkton, Maryland when having moved the shield he removed a flask containing a reactive from a rotary evaporator. The material exploded and the glass fragments cut his throat.

A Texas high school student drowned on a marine biology class field trip while collecting samples in the Gulf. He slipped, panicked, and could not swim. He was not wearing a flotation device.

An Illinois elementary school teacher asked students to help move materials to a new classroom. The unsupervised student, his brother and two sisters suffered severe mercury poisoning playing at home with mercury taken by the student. Their home was contaminated and ruined. The family sued and received a \$624,000 out of court settlement.

1992 A researcher, electrochemist Andrew Riley, at the Stanford Research Institute in Menlo Park, CA was killed on January 2nd and two other injured in a hydrogen-oxygen explosion during a cold fusion experiment.

One person was killed and several injured at Merck in Pennsylvania when an autoclave exploded.

Ralph "Corky" Soldato, a General Electric chemist in Pittsfield, MA, was killed in an explosion of a centrifuge at the Plastics Research Center.

Graduate student at RPI is badly burned when lithium aluminum hydride she spills on herself ignites as she tries to wipe it off. RPI was fined \$62,500 by OSHA.

A graduate student at Southern Illinois University at Edwardsville was killed in a hydrogen explosion in a fume hood drying acetonitrile with a hydride.

1991 A Texas A&M graduate student was injured at Ranger Junior College while disposing of some sodium and it exploded.

Fire kills postdoctoral fellow and serious burns student at Western Ontario University Chemistry Department.

An Eckert College student suffered "traumatic and disfiguring" injuries when nitric acid spilled in her lap. She sued the college.

Checotah, Oklahoma high school students stole potassium cyanide from school lab bench and mixed it in a drink killing a fellow student.

Three people were killed in laboratory accidents at the University of Heidelberg, Germany.

At Osaka University in Japan a silane cylinder contaminated with nitrous oxide exploded, two graduate students were killed.

1990 The explosion of a liquid stored in a non-explosion proof refrigerator destroyed the research lab and its contents at a university in Texas.

A New Jersey high school student was electrocuted during a physics class while working on a TV set as part of an electronics unit.

College Junior at Vanderbilt University (Nashville, TN) lost an eye when her azo compound synthesis project exploded.

A high school student in Okinawa, Japan was snorkeling in an oceanography class. The student left the group without permission and was in an unauthorized area. He drowned.

1989 University of Pennsylvania graduate student was seriously injured in explosion.

Two Peekskill, NY middle school students were seriously injured in stockroom explosion. One loses eye. Family sued for 50 million dollars. 10 Million Settlement and within one year NY has a new law requiring schools to have locked storage and inventories

Three students and a teacher injured in alcohol fire and explosion at Holbrook, Massachusetts junior high school.

Stockroom man lost one eye in an explosion of 98-100% formic acid at University of Sydney, Australia

Two analysts died in Michigan from Herpes contracted in the laboratory.

Eastern Kentucky University student who suffered traumatic and disfiguring chemical burns in the groin area has sued the university.

A Rhode Island graduate student lost his arm when liquid nitrogen exploded on transfer.

A science teacher (Mary Ann Stewart) working alone falls into broken glass and concentrated sulfuric acid. There is not safety shower in the lab. She's out of work for over 18 months.

New Jersey HS student electrocuted working on TV Set in physics class.

1988 Dawn Collins, 29, died at Pierce College after drinking a saline solution as part of an A&P experiment. It contained sodium azide preservative. Family sues for 2.5 million dollars.

Lab explosion kills four at CIL Explosives and Technical Center in McMasterville, Quebec.

Teacher and student injured in explosion at Newton County High School in Covington, GA.

Tennessee graduate student was burned on the hands, forearms, and face when refluxing tetraethyl lead compound exploded.

A custodian goes into coma and dies following inhalation of old chemicals thrown into a dumpster by new California high school teacher.

1987 Princeton University graduate student suffered cut arms, face and hands in lab explosion.

Five junior high school students were injured in Collingswood, NJ lab explosion.

San Bernardino science teacher was seriously injured in sodium explosion at high school.

Drexel University sued by graduate student seriously burned in explosion of molten lithium during clean up.

An explosion occurred in a Berkley Heights, NJ gas industry analytical lab. Silane instead of acetylene was hooked to an AA. Three were killed and one seriously injured. Steven Carveillas, Lou Molinini, 3rd was unknown.

1986 Columbia University lab explosion

Four students and a teacher were hospitalized following an alcohol explosion and fire at a Wallingford, CT middle school.

Four students injured in alcohol explosion at Vermont private school. One hospitalized for six months sues school for six million dollars.

A drunken worker smoking in a boiler room started a fire at Friendship Moscow State University's chemistry and engineering building. Five stories of the building were partially burned. A Ph.D. student from India died.

1985 Graduate student suffers burns and brain damage in lab explosion at Dartmouth College. He sues the college and hotplate manufacturer for 5 million dollars.

Four Washington DC elementary school children injured in explosion of experiment to make "sparklers" (gunpowder). DC Superior Court jury awards 11 million dollars (1988).

A lab worker at the MIT Lincoln Lab in Bedford was using Arsine. A leak developed undetected and he died as a result of the exposure.

1984 A lab explosion at the University of Wisconsin in Madison injured several students.

Pensacola, Florida high school senior was injured by spilled sulfuric acid. She received \$30,000 in an out of court settlement.

Junior at Wellesley College required 300 stitches following an explosion in the laboratory. The Brockton, MA family sued for 3.8 million dollars.

Helena Zinger died in an Antwerp, Belgium laboratory accident

1983 A post-doctoral fellow at the University of California at Berkeley lost one eye and injured two fingers when a reaction product exploded. He had removed his safety glasses to look at the material.

A Lee High School student in San Antonio, Texas was electrocuted when he stuck a mechanical pencil in a science lab electrical receptacle.

Maintenance worker died of Q-fever at UCSF Medical Center after contracting disease from sheep transported in a service elevator.

1982 A Michigan lab technician in a state laboratory died from burns obtained from operating an autoclave. It was a cage cleaning autoclave and she was trapped inside.

A high school junior in Lee, Massachusetts lost three fingers and suffered chest injuries in a lab explosion.

A spark from a cheap light fixture caused an explosion at a Northeast Ohio hazardous waste treatment facility that blew the operator across the facility and caused second and third degree burns on his face, neck, chest, and arms.

1981 Graduate student nearly killed in explosion at Michigan Technology University. Femoral artery severed by glass.

Six students and one instructor were hospitalized when the distillation of alcohol over an open flame exploded at a Florida community college general chemistry course.

At the Sullivan Park Research Facility of Corning, Inc., an HF tank leaked. A clean-up crew went in without proper respirators and two workers died.

A university student in Kazakstan at the Academy of Sciences was killed when a refrigerator exploded. Ethyl ether was being stored in the refrigerator.

1980 A university student in Texas was severely burned when bromine he was dispensing spilled on his hand and he failed to report the incident.

A female student at U. Mass - Boston used a "clean beaker" for a drink of water from the lab faucet. She died instantly from an overdose of traces of a chemical left in the beaker.

An Oregon undergraduate was very badly burned and cut on her face, neck, and hands.

1979 Graduate student killed in solvent explosion at Southeastern Massachusetts University. Faculty member husband sues and receives out of court settlement.

A Doctoral student at a university in Ohio received severe lacerations on the chest, waist, and arms requiring 40 stitches when an experiment exploded. The student opened the hood in an attempt to shut down the runaway reaction.

A Southern Illinois University undergraduate suffered severe burns of his legs and feet and was left with permanent scars when a container of hot cleaning solution broke.

A fire involving organic extraction solvents in a geochemist's laboratory at Arizona State University killed a graduate student.

1978 Students in a Delaware school steal sodium from an unlocked storage closet and throw it in a drinking fountain. The sodium explodes in the face of young lady taking a drink causing burns to her face, chest, and head and permanent scarring.

A Toronto, Ontario student, sitting in the next to last row, was struck above eye by flying glass when a zinc/sulfur mixture exploded in a test tube.

A Washington State high school student died when the nitroglycerine he had synthesized blew up in his pocket on the way to the football field.

A Custodian died of suffocation at the Baptist Community School in College Park, Maryland. He was in the closet for a Halloween party making carbon dioxide smoke to make the party more spooky.

Janet Parker, a 40-year-old medical photographer at the Medical School at Birmingham University (Britain), died in July following laboratory exposure to smallpox.

1977 A high school junior in Glens Falls, NY suffered severe burns on the front of her body. She spilled 200 ml of concentrated nitric acid on herself. There was no shower.

A refrigerator exploded at Bowling Green State University (Ohio) following a power failure. The lab and two cars outside the lab were badly damaged.

A lab worker died after contracting herpes-B virus from a Rhesus monkey.

1976 A Texas high school student died of injuries sustained in an alcohol fire. He was attempting to refill an alcohol burner while it was still lit.

A 2nd year chemistry student put a boiling stone into a flask containing hot acid. The solution suddenly bumped sending solution out the top of the reflux condenser. The student was not wearing goggles and lost an eye.

A graduate student at Arizona State University died 4 days after sustaining 3rd degree burns in a fire that started in a hood and trapped him at his desk in the corner of the room. ASU settled out of court with his widow.

An organic chemist died of edema following exposure to methylfluorosulfate at the Technische Hogeschool Twente, Enschede, the Netherlands. A container broke in a fume hood splashing some on the chemist. He wither underrated or failed to observe his contamination. He began coughing within one minute. Although he went to the hospital, he died within six hours.

1975(?) A Springfield school system junior high school student suffered severe burns when an alcohol lamp fell and ignited during a general science experiment.

A Westbrook, Maine high school student was electrocuted while using an 800-volt transformer.

A student in a hydraulic class was hastily looking for a high-pressure leak in a hydraulic hose. He received a near fatal injury by having hydraulic oil injected into his hand and arm.

1974 A student in New Zealand lost an eye when a 1st year teacher's potassium demonstration exploded.

Thirteen children and the teacher were killed in Brisbane Australia during a demonstration on how to make a rocket engine using a four-inch copper pipe.

A Connecticut high school student was seriously injured when a piece of stolen sodium ignited in his back pocket as he walked to the boys' room.

A Stanford University graduate student, 22 years old, was killed when the lid flew off an improperly depressurized vacuum desiccator. The lid hit the wall and a glass fragment went through his eye into his brain.

A student at the University of Texas in Arlington was badly burned when a beaker of ether was placed on an already hot hotplate.

1973 Worcester Polytechnic Institute chemistry graduate student lost portions of both hands in lab explosion grinding a highly reactive material.

University of Pennsylvania 23-year-old graduate student lost one eye and suffered other injuries in a lab explosion during a diglyme distillation. He was awarded \$750,000 from the chemical manufacturer, MCB.

Major fire destroys chemistry laboratories at University of Chicago.

Three Latham, MD junior high school students badly burned in methanol fire sue the school board and are awarded \$200,000.

1972(?) A Massachusetts high school student loses eye in chemistry lab. No eye protection was being worn.

Graduate student electrocuted at Massachusetts Institute of Technology in lab while working on live circuits. OSHA finds over 1,600 violations in one-quarter of the labs costing \$400,000 to fix.

Teacher at Greenville ISD (Texas) was badly burned on her face, arms, and body when sodium exploded during a demonstration.

Two lab workers were killed at the Olin-Matheson in New Haven, Connecticut were killed when a solid propellant exploded.

1971 Five Hartland, Michigan eighth graders were injured in school lab fire. Two suffered burns over 30 percent of their bodies.

(?) Two boys took some sodium metal from a high school lab. They placed it in a bathtub of water. The explosion took three fingers off of the boy's hands.

University of Washington undergraduate was killed in p-chem lab in Bagley Hall. Waste solvent was poured into container causing explosion and fire.

The chemistry building at the University of Nebraska burned to the ground as the result of an unauthorized freshman laboratory experiment.

The explosion of a high-pressure steel bomb at the University of Washington in Seattle severely injured a graduate student ready to complete his Ph.D. dissertation. He lost one arm and had over 50 operations to remove hundreds of pieces of steel lodged in his face and body.

1970 An old refrigerator exploded in a Mississippi university science laboratory blowing out a wall and seriously damaging the storeroom.

An undergraduate at a university in New York was splashed with glass cleaning solution when the bottle broken. The acid burns required bandages for 3-4 months and plastic surgery.

Student loses cornea in one eye as the result of a sodium hydroxide splash.

An Assistant Professor of Chemistry at MIT, Barry Sharpless, lost the sight in one eye when a sealed NMR tube exploded. He had removed his safety glasses and put on his coat to leave but return to briefly look at the tube.

A major lab fire occurred at Ohio State University (probably 1969 or 1970). I believe an acryloin condensation got out-of-hand at night when no one was around. It burned out an entire lab module. It may have been in Mel Newman's area.

1969 A student at the University of Washington was killed in explosion of sodium in a physical chemistry laboratory.

At Blackburn College, a young woman lost both eyes and the skin over her nose when a hot mixture of cyclohexanol and sulfuric acid exploded. She was wearing impact goggles.

Lab worker in New York City lost two weeks and suffered much pain when dicycloicarbamide splashed in eyes while only wearing safety glasses.

At Queens College, a senior student working at a hood blew out his intestines. Dr. Axelrod, his instructor rushed over and held in the student's intestines. The student lived to collect a substantial settlement.

1968 An Akron, Ohio teacher was supervising the generation of chlorine gas by her high school class. A student ran into trouble because the system was backing up. When the teacher went to help the apparatus came apart. She inhaled chlorine directly as the students scattered under her instructions. She was hospitalized and never fully recovered her lung capacity.

A Florida undergraduate lost half of his right hand when a pipe bomb he was making exploded prematurely.

A student was making fireworks at home with chemicals stolen from his high school. He lost the sight in one eye and the use of two fingers in one hand.

An undergraduate was hospitalized for three month with burns sustained when gas from a cylinder ignited.

A lab fatality occurred at Ohio State University during the 1968-69 school year. I can put the date after 6/68 as that was when I got married for the first time, and Ray Kemp died on a night I had spent at home. Both of us were working for Derek Horton (now near retirement at American U in Washington). Ray had come back to grad school after a few years in industry and had wife and young child. He was working on making 7-carbon sugars via Killiani-Fisher synthesis. This involved making the 6-aldehyde sugars and adding cyanide across the aldehyde group. According to news reports, Ray put KCN in his Coca-Cola. He was reportedly working alone, which was pretty normal in Horton's group. Everyone was allowed to do his or her own thing when they wanted to do it. I came close to blowing myself up a few times, but luck was on my side. The only time Horton got in trouble was when some mercaptans got down the drain and the OSU cops thought there was a gas leak. (Editor's note: Read Isaac Asimov's "A Whiff of Death" murder mystery!)

1967 A Maryland high school student lost her sight in a chemistry laboratory when she poured water into a beaker of sulfuric acid. In addition, she suffered considerable permanent damage to her face, arms and chest.

An undergraduate in physical chemistry died of burns sustained in an explosion and fire possibly cause by making cleaning solution with nitric instead of sulfuric acid.

On the 11th floor at U. Mass - Boston, an ether fire at the end of my bench produced wall to wall and floor to ceiling flames briefly trapping me near the windows.

1966 A chemist was killed in an explosion while working with explosives at the Hercules Powder Company in Port Even, NY.

A chemistry lab instructor at Suffolk Community College in Selden, NY brought out a jar of sodium. He tripped and dropped the container ... flash fire ... he was burned and evacuated to a hospital. He died a few days later.

A graduate student was killed at Princeton University when an unchained gas cylinder fell and the valve was sheared off. The cylinder went through the wall killing the student in the adjacent lab.

A biology graduate student at Brown University was electrocuted while conducting an electrophoresis experiment.

A high school senior was electrocuted in a Westbrook, Maine science classroom while rehearsing a talk on oscilloscopes.

1965 A high school chemistry teacher lost an eye and his students in the first row were hospitalized when he added water to sodium thinking it was phosphorous.

In an organic chemistry lab, a student had started generating HCN into the atmosphere of the lab. He passed out and had to be hospitalized. He was lucky not to die.

An MIT student was seriously burned when an unclamped refluxing flask fell, broke and ignited in organic lab.

A chemistry department student at the University of Poland in Wroclaw was killed when a copper +2 reduction by hydrogen gas at high pressure in an autoclave exploded.

1964 A UNH (Durham, NH) undergraduate threw a lab notebook over the lab bench knocking over a full bottle of HCl. The acid went all over a classmate's arm causing severe burns and requiring extensive medical treatment. Student lost the use of thumb and forefinger as the result of broken glass cutting his tendons. He pushed the test tube brush through the bottom of the test tube.

A lab technician at Palynolab Resources Pty Ltd in Western Australia died from burns sustained when he accidentally spilled concentrated (70%) hydrofluoric acid on himself.

A high school science student was severely burned in a lab fire in Trenton, Florida. The science teacher was fired.

1963 An Oklahoma State graduate student lost part of one hand when an azide distillation exploded.

An undergraduate organic student was severely burned when a startled classmate threw an ignited beaker of methanol over his shoulder. The victim was engulfed in flames resulting in burns, which required his entire back to be skin grafted.

Morton Thiokol worker at Alabama facility died in the explosion of some saved solid propellant.

1962 A chemist at a New York pharmaceutical research company refused to wear eye protection or keep the hood sash down. An explosion occurred and she lost the sight in one eye. In a lawsuit that lasted 20 years, she received only medical expenses.

1961 A student was splashed by acid as the result of horseplay. The student needed hospitalization for skin grafting and cosmetic surgery. The school system settled out of court for \$50,000.

A graduate student at the University of Wisconsin in Madison found a dirty round bottom flask in the sink. He held it by the bottom while washing it. The water hit the residue of a strained ring compound. The explosion mutilated the student's hand. He lost it.

Two Tennessee Harriman HS students were hospitalized for several days with burns after an explosion following mixing several acids together.

1960 Seattle, WA High school senior damages right knee, bursts both ear drums, and blows off right hand mixing red phosphorous and potassium chlorate in school lab on the day before his graduation.

Hydrofluoric acid stored above eye level splashed in the face of a short Colorado student causing very severe burns as well as scarring.

1960's A student put a large chunk of sodium in a sink. He observed the reaction up close. He is now a blind attorney in Ada, Oklahoma.

1959 An ether explosion in a refrigerator at Peter Bent Brigham Hospital caused significant damage to the lab. The firemen destroyed many records with water.

A clogged coolant channel resulted in a 30% reactor core meltdown at the Santa Susana Field Laboratory (now known as the Boeing-Rocketdyne Nuclear Facility) in the Simi Hills area of Ventura County, California. Later discovery of the incident prompted a class-action suit by local residents, who successfully sued for \$30 million over cancer and thyroid abnormalities contracted due to their proximity to the facility.

1958 Harlow Mork, a graduate student at Michigan State University was killed and other injured when distilling thiophene detonated in a chemistry lab. The other student (Philip Freeman) required extensive surgery to repair damage to his ears

A group of students in Columbia, Tennessee who were conducting a chemistry experiment with nitric acid had an explosion. The acid scarred the face and hands of one of the students.

1957 An Odessa, Texas high school student was out of school for seven months with injuries requiring numerous surgeries. He stole sodium and tossed it in a tub of water.

A 31-year-old male laboratory worker (Dr. M.S.) died from Herpes B infection. He was engaged in the production of polio vaccine with Rhesus monkeys at the National Viral laboratory, National Health and Welfare Canada. This case is reported in the Can. Med. Assoc. J. Vol. 79, Nov 1958.

1956/7 A student lab assistant in Florida took sodium home in his pocket. It ignited while walking home and he was burned over 70% of his body, lost one year of schooling and suffered permanent scarring and disability.

1956 A research chemist's unauthorized high-pressure hydrocarbon oxidation experiment exploded while a colleague passed by. The colleague died as a result of extensive 3rd degree burns.

1955 Two Chemists died at the Sylvania Electric labs in Bayside, New York when a hot crucible fell into a barrel of thorium dust powder.

1954 A new employee at a steel mill in Ind. Harbor, Indiana was asked to cut the top off a 55-gal drum. The explosion blew his head off.

1953 A chemist working in Chicago for Morton Salt was killed opening a bottle containing peroxides that exploded into his abdomen.

1952 One man died and a second was seriously injured they cleaned up a broken bottle of methyl sulfate in the stockroom of the University of Braunschweig, Germany.

1951 An ether explosion at the University of Colorado in Boulder badly burned three students and destroyed the lab. It took almost a year to rebuild the lab.

A student at Bassick High School in Bridgeport, Connecticut was burned and blinded in a potassium perchlorate explosion.

1950 Working with a chemistry set at home, a jar of potassium chlorate and charcoal exploded in a friend's hand causing serious burns and cuts.

1949 ???

1948 A tank wagon at BASF, Ludwigshafen, Germany, was filled under pressure with dimethylether, It was overfilled, so the liquid phase filled the complete volume of the wagon. When the wagon heated up in the sun the liquid expanded, ripped the wagon open and ignited. An eye witness said that he saw a big fire ball rising over the site. 291 people lost their lives.

1947 A ship loaded with ammonium nitrate burned and then exploded in Texas City, Texas killing 550 people.

1946 Louis P. Slotin, a Canadian physic professor at the University of Chicago died as the result of a 1000 rad exposure in an accident involving radioactive materials at Los Alamos.

1945 Harry K. Daghlian, Jr. died at Los Alamos National Laboratory in NM. The young physicist was accidently exposed to radiation after he dropped a tungsten carbide brick into a plutonium bomb core.

1944 Peter Bragg and Douglas Paul Meigs, two Manhattan Project chemists, were killed when their attempt to unclog a tube in a uranium enrichment device led to an explosion of radioactive uranium hexafluoride gas exploded at the Naval Research Laboratory on September 2nd in Philadelphia, PA. The explosion ruptured nearby steam pipes, leading to a gas and steam combination that bathed the men in a scalding, radioactive, acidic cloud of gas which killed them a short while later.

1943 Sam Ruben died due to a lab experiment at Univ. Cal/Berkeley. Pioneer in the techniques leading up to the discovery of the first known "dark reaction" of photosynthesis, now known as the Calvin Cycle

1940 An Illinois graduate student was killed. The explosion of the contents in a household refrigerator used to store chemicals destroyed the refrigerator and killed the student.

1938 Wisconsin student lost all of one hand and most of other in chemical explosion making "torpedoes" with phosphorus and potassium chlorate.

A 15-year-old Texas girl died from burns sustained when her gasoline burner exploded when she attempted to pump pressure into it.

1937 A gas leak in the crawl space under a New London, Texas school resulted in an explosion that destroyed the school and killed 331 people. See www.nlse.org for pictures and more information.

1935 A graduate student at the University of Wisconsin lit a cigarette while doing an experiment that generated hydrogen. The explosion blew out all the windows

and the door off its hinges embedding it in the wall across the hall. Because he was in the middle of the room, he was miraculously unhurt.

1934 Marie Curie died in France from aplastic anemia contracted from exposure to radiation.

1929 In Hungary, a science teacher was doing a demo with potassium. A piece of it flicked off and landed in water. The potassium flew up into the air and landed on his skull killing him on the spot.

1921 An explosion at the BASF chemical plant in Oppau (Ludwigshafen), Germany killed 509 people and injured 1950. The ammonium nitrate/ammonium sulfate explosion blew out window 23km away in Heidelberg. The shock was felt 275 km away at the site of the Wagner music festival. The explosion was heard in Munich.

1904-1935 Twelve deaths are reported due to radiological pioneers work with x-rays.

1904 Clarence Madison Dally, blower at Thomas Edison's Menlo Park lab, is the first person known to have been killed by x-ray exposure. Severely burned in 1896, he still works with x-rays until 1898. His death in 1904 causes Edison to discontinue radiation work in his lab.

When?

When? Student lost a hand in an explosion that occurred while cleaning a refrigerator at California State University in Los Angeles.

A chemistry teacher dropped a piece of sodium into a fish tank. The explosion killed one of the nearby students.

A custodian at Malone School was killed as the result of an exposure in a confined area to a strong solvent, 1,1,1-trichloroethane. It triggered a heart attack. A similar death occurred in 1985 to a maintenance worker in Rhode Island.

A Tennessee gravestone for a dead twenty-one year old bears the inscription "Due to the negligence of others in the laboratory."

A graduate student at the University of Heidelberg died of burns sustained in a lab fire. He was on fire. He went to use the safety shower but pulled the wrong chain on a two-chain shower valve.

(Year unknown; before 1968) Biochemist was killed when his suction filter flask imploded.

Send LSI your accident story:

Laboratory Safety Institute, 192 Worcester Road, Natick, MA 01760-2252
508-647-1900 Fax 508-647-0062 Email: info@labsafetyinstitute.org

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About the Laboratory Safety Institute

The Laboratory Safety Institute is a non-profit organization whose mission is to make health and safety an integral and important part of science education, work, and life. LSI provides training, consultations, publications, audio-visual materials, and responds to requests for information.

LSI was founded in 1978 as The Laboratory Safety Workshop by James A. Kaufman, Ph.D.. His experience working for the Dow Chemical Company convinced him that schools and colleges were not doing enough to encourage health and safety. Studies by LSI and others have shown the accident rate at schools and colleges to be 100 to 1000 times that of Dow and DuPont.

Since 1978, Dr. Kaufman has trained over 70,000 science educators and scientists. His brand of safety training is a unique blend of technical information, practical and inexpensive solutions, humor, and accounts of accidents drawn from a collection of over 5,000 examples.

LSI has produced Several lab safety, training audio-visuals: *The One-Day Lab Safety Audio Course* (5.5 hours), *The Two-Day Lab Safety Video Short Course* (eight, 90-minute VHS Cassettes or DVD Diskettes), *An Introduction to Lab Safety* (two, 90-minute DVDs), and *An Introduction to Lab Safety for Teaching Assistants* (45-minute PowerPoint presentation).

LSI publishes a newsletter: "Speaking of Safety".

LSI offers lectures, seminars, short courses, audit and inspections, and regulatory compliance and safety program development consultations throughout the world for academic, industrial, medical, and government laboratories.

LSI operates an Internet discussion list, LABSAFETY-L, and maintains an informative website (<http://www.labsafetyinstitute.org>)

LSI is supported by corporate sponsors, agencies, associations, generous individuals, its members. Members receive a newsletter subscription, use of the audio-visual and reference lending libraries without rental fee, a 10% discount on most LSI publications, a 5% discount on training and consultation services, and use of the Toll Free, 24-hour Lab Safety Information Hotline.

The Journal of Chemical Education called The Laboratory Safety Institute "A national resource for safety conscious science teachers". If you would like to help support the efforts of The Laboratory Safety Institute: (1) Subscribe to "Speaking of Safety", (2) Become a member of LSI (partially tax deductible), and (3) Make a contribution (tax deductible).

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About the Editor

Dr. James Kaufman is President of The Laboratory Safety Institute, President of Kaufman & Associates and former Professor of Chemistry at Curry College. He received his bachelors degree in chemistry from Tufts University and his doctorate in organic chemistry from WPI.

After two years as a post-doctoral fellow in the WPI Chemical Engineering Department converting garbage into fuel oil, Dr. Kaufman joined the Dow Chemical Company's New England Research Laboratory as a Process Research Chemist. During his four years with Dow, he became increasingly involved in laboratory safety related activities. He authored "Laboratory Safety Guidelines". Originally distributed by Dow, now over two million copies of the widely requested and reprinted brochure are in circulation.

Dr. Kaufman is the founder and president of The Laboratory Safety Institute - a national, non-profit center for safety in science and science education. LSI's lectures and training programs, AV. lending library, and publications help academic institutions throughout the world. LSI is supported by grants from individuals, foundations, companies and professional societies.

As a safety consultant, his company, Kaufman & Associates, conducts seminars, short courses, audits and inspections for schools, colleges, and companies. They also provide advice on regulatory compliance, safety program development, facilities design and editorial commentary on laboratory texts.

Dr. Kaufman is a former, ten-year member of the American Chemical Society's (ACS) Council Committee on Chemical Safety and is past-chairman of the 2,500 member ACS Division of Chemical Health and Safety. He is the author-narrator of the ACS Audio Course on Laboratory Safety and editor of "Waste Disposal at Academic Institutions" from Lewis Publishers. He recorded and edited the "One-Day Laboratory Safety Audio Seminar" and "Two-Day Lab Safety Video Course." He is a co-authored of "Safety Is Elementary: the new standard for safety in the elementary science classroom"

Most recently, Dr. Kaufman was appointed chair of the Safety In Science Education Committee of the International Council of Associations for Science Education (ICASE).

How You Can Help

There are three ways to help: (1) Subscribe to our newsletter, *Speaking of Safety*, (2) Become a member, (3) Make a donation, or (4) Become a volunteer. For more information about volunteers, subscriptions and memberships, please visit our website (www.labsafetyinstitute.org) or call 508-647-1900.

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