Some Lessons Learned from 50 Years of Nuclear Engineering
First a bit of history...
The Michigan Memorial Phoenix Project
The Michigan Memorial Phoenix Project

One of the most significant initiatives of the University following WWII was the Michigan Memorial Phoenix Project, a major nuclear research laboratory established by the University and funded by private gifts as a memorial to the 579 members of the Michigan family who had lost their lives in the war.

It was a student committee (comprised of WWII veterans) that pressed the Regents to accept the idea of the Phoenix Project after it was first developed and approved by student government.

They sought a WWII memorial that would aid all mankind rather than to attempt to build “a mound of stone the purpose of which might soon be forgotten.”
These Honored Dead

The University of Michigan has placed these names upon the roll of those students and alumni who, in the fine tradition of loyalty and self-sacrifice established by former generations, served their country in time of peril, and have given their lives in defense of our national liberties. They will forever be held in honor.


Charles Melvin Allen, A.B.'33, '33-'34. 1st Lt., Army; killed in action, Germany, November 18, 1944.


Robert William Allen, A.B.'44. 2nd Lt., Marine Corps; killed in action, Okinawa, May 5, 1945.

Courtney Derby Allington, a'38-39. Sgt., AAF; killed by enemy action, Mediterranean, July 12, 1943.

Robert Charles Allmendinger, a'36-39. 2nd Lt., AAF; killed in air accident, Idaho, February 26, 1944.


Robert Olof Anderson, A.B.'35. Lt. (jg), NA; drowned off Norfolk, Virginia, June 8, 1941.


Erwin Edwin Antilla, B.S.E. (E.C.) '37. 2nd Lt., AAF; missing in air action, Italy, August 20, 1943.

Howard Ark, A.B.'38. Lt. Col., AAF; killed accidentally, Germany, December 24, 1945.

Richard Dean Arkins, A.B.'42. Lt., NA; killed in air accident, off California coast, May 22, 1944.

Alfred Leston Arnold, a'40-43. 1st Lt., AAF; killed in air accident, Asiatic Theater, May 7, 1944.

James Byron Ashley, A.B.'38, M.D. '41. 1st Lt., Army Medical Corps; killed in action, Guadalcanal, January 14, 1943.

Frank Kellogg Bachelder, arch'36-39. 1st Lt., AAF; killed in air action, Timian, March 30, 1945.

Henry Franklin Bain, Jr., e'42-43. Killed in action, Philippines; no further details.


JAMES MORLEY BARCLAY, M.S.'38. Capt., RCAF; killed in action, Normandy, June 6, 1944.

EARL DAVID BARNARD, c'36-39. AMM 2/c, Navy; lost in flight, Pensacola, Florida, June 5, 1942.

DWIGHT MARVIN BARNEY, g'34-35. Sgt., Marine Corps; killed in action, Java Sea, March 2, 1942.

RAYMOND EARL BARRETT, c'34-38. 2nd Lt., AAF; killed in action, Bataan, April 15, 1942.

KEITH ORLAND BARTLETT, a'36-38. Lt., AAF; killed in action, Europe, March 31, 1943.


MEIGS WELCH BARTMESS, g'32-34. Lt. (jg), Navy; killed in action, Okinawa, April 16, 1945.

KEITH HOWARD BARTON, A.B.'42. Sgt., Army; killed in action, India, October 24, 1944.

ROBERT IRVIN BATES, c'42-43. 2nd Lt., AAF; killed in action, China, September 19, 1944.

MARTIN BATS, Jr., M.D.'39, M.S.'40. Maj., Army Medical Corps; died of disease contracted in New Guinea, Battle Creek, Michigan, July 8, 1944.

JAMES EMERSON BAYNE, A.B.'30. Lt. (jg), Navy; lost in naval action, Atlantic, March 17, 1943.


JOHN STRATTON BEAUCHAMP, B.S. Chem.'43. Ens., Navy; lost in naval accident off Massachusetts coast, June 29, 1944.

FRANCIS HERBERT BECK, c'39-40. Lt., AAF; killed in air accident, China, May 21, 1944.

VERN HERBERT BECKER, c'37-40. Lt. (jg), NA; missing in flight, Pacific, December 7, 1944.

WILMER SEELEY BECKER, b'38. 2nd Lt., Army; died of wounds received in action, France, August 8, 1944.

WILLIAM CHARLES BELKE, a'42-43. f'42-43. Pvt., Army; killed in action, Germany, February 28, 1945.

ARTHUR LOUIS BENSON, A.B.'34, M.D.'37. 1st Lt., Army Medical Corps; Japanese prisoner of war, lost in sinking of prison ship, Pacific, October 24, 1944.

GEORGE HEMINGWAY BENNETT, c'40-41. 2nd Lt., AAF; killed in air accident, San Diego Bay, California, March 13, 1942.

JAMES STEPHEN BERTOLIO, M.D.'43. Capt., Army Medical Corps; killed in action, Germany, January 10, 1945.

FREDERICK JOHN BIERKAMP, A.B.'42. Lt. (jg), Navy; killed in action, English Channel, June 12, 1944.

LESLIE SUTHERLAND BIRLESON, A.B.Ed. '39. 1st Lt., AAF; killed in air action off North African coast, November 17, 1942.

FRED JAMES BLACK, M.D.'32. Maj., Army Medical Corps; Japanese prisoner of war, lost in China Sea, October 24, 1944.

ROMAINE OMAR BLANDY, B.S.E. (M.E.)'43. Ens., Navy; killed in action, Mediterranean, May 5, 1944.

DONALD MAX BLUE, c'42-44. Pvt., Marine Corps; killed in action, Okinawa, April 14, 1945.

FREDERICK CARL BOFIN, c'42-43. 1st Lt., AAF; killed in air accident, England, November 18, 1944.

MAURICE PHILLIP BOGUARD, arch'31-33. 2nd Lt., AAF; killed in air accident, Matagorda Island, August 20, 1942.
FRANK MICHAEL BONCAR, e'42-43. Pfc., Army; killed in action, France, November 14, 1944.

RUDOLPH FREDERICK BOSTLEMAN, A.B.'27. Maj., AAF; killed in air accident, Mt. Brooks, Alaska, September 18, 1944.


IRVING BOTVIN, B.S.'41. g'41-42, e'42-43. 2nd Lt., Army; killed in action, Okinawa Harbor, April 6, 1945.

RICHARD EDWARD BOYE, A.B.'40. 1st Lt., AAF; killed on bombing mission, Germany, August 25, 1944.

EDWARD DEFOREST BRADSHAW, a'36-38. Capt., Army; died of wounds, Leyte, December 16, 1944.


VALENTINE JAMES BRAUN, e'39-40. Lt., AAF; killed in air accident, Michigan, June 7, 1945.

LLOYD ANDREW BROGGINI, e'42-43. Pfc., Army; killed in action, France, December 7, 1944.

EMIL FRED BROMUND, B.S.'38, A.M.'39. g'39-40. Pfc., Army; died of wounds received in action, Germany, November 14, 1944.

CHARLES DOUGLAS GRANT BROWN, e'36-38. Sgt., RCAF; killed in action, Shetland Island Area, February 21, 1942.

JAMES MARSHALL BROWN, A.B.'38. 1st Lt., Army; killed in action, Normandy, June 14, 1944.

WILFRED HARRY BROWN, A.B.'40. Capt., Army; killed in action, France, August 19, 1944.

THOMAS CHURCH BROWNFIELD, a’36-37. Capt., AAF; killed in air accident, Texas, February 8, 1945.


WILLIAM EMMETT BUCKEY, JR., a'41-43. S 1/c, Navy; missing in action, China Sea, October 23, 1944.


WILLIAM HENRY BUDERUS, JR., B.S. Arch. (Arch.) '34. Lt., Navy; died of wounds, near Philippines, October 26, 1944.

RAYMOND A. BURDICK, a'40-42. 1st Lt., AAF; killed in plane crash, Luzon, April 27, 1945.

FRANKLIN DAVID BURT, e'38-40. 1st Lt., AAF; killed by enemy action, English Channel, September 4, 1943.

DAVID WILLIAM BURTON, B.S.E. (Met. E.) '42. Lt. (jg), Navy; missing in action, Asiatic Area, March 21, 1945.

WILLIAM BERNARD CALDWELL, arch'41-43. Ens., Navy; killed by enemy action, Okinawa, April 6, 1945.

RUSSELL DEAN CALKINS, J.D.'15. Capt., Navy; died, Naval Hospital, Bethesda, Maryland, May 8, 1944.

NORMAN DANA CALL, A.B.'42. Lt. (jg), Coast Guard; lost at sea off Virginia coast, September 14, 1944.

GEORGE HAM CANNON, B.S.E. (M.E.) '38. Lt., Marine Corps; killed in action, Midway, December 7, 1941.

GEORGE MILLER CANNON, e'41-43. 1st Lt., AAF; killed on bombing mission, Germany, February 8, 1945.

ORRIN OTIS CARPENTER, JR., e'40-42. 2nd Lt., Army; killed in action, Normandy, June 14, 1944.
IT IS traditional with the people of our nation to pay eternal tribute to their hero dead. Through countless communities the monuments of five major wars stand as reminders of their sacrifice and heroism. But it has been one of the frustrations of man that no monument of his making can ever match the courage and conviction of those who made the supreme sacrifice. Can there be a fitting memorial for the war dead? Can there be a fitting memorial for the heroes of the war that produced the atom bomb?

There is only one appropriate kind of war memorial — a memorial which will eliminate future war memorials.

We at the University of Michigan believe this is possible. Our students, alumni and faculty members have conceived, under the name Michigan Memorial-Phoenix Project, a war monument that may well point the way to the elimination of wars.

The Phoenix Project proposes to turn a weapon of war into a potent instrumentality of peace. It proposes to do research with atomic tools solely in the interest of man's well being. Through it a leading American university will send forth great scientists, engineers and other scholars, and will open vast physical resources in an effort to turn the atom into pathways of peace. Here doctors, chemists, biologists and others will seek cures for "incurable" diseases; engineers will convert new knowledge into methods of better living; social scientists will attempt to evaluate and chart the social, economic and cultural implications of the atomic age.

Here, like the Phoenix bird of ancient legend, the atom's force will rise from the ashes of its own destruction and point the way to a better, fuller, happier life than man has ever known.

The monument proposed by Michigan transcends the conventional "living" memorial. It will be a dynamic, working, life-serving memorial. It provides a rare opportunity to answer the challenge of our hero dead: "To you, from failing hands, we throw the torch; be yours to hold it high."

Memorial Day statement to the Alumni of Michigan by University President Alexander G. Ruthven.
The Fund Raising Effort

In May, 1948, the Regents adopted a resolution that “the University of Michigan create a War Memorial Center to explore the ways and means by which the potentialities of atomic energy may become a beneficent influence in the life of man, to be known as the Phoenix Project of the University of Michigan.”

The University launched its first fund-raising campaign that raised $6.5 million for a research building, a research endowment, and, a nuclear reactor (sponsored by Ford).

It is noteworthy that the membership of the fund-raising committee included three students who were all veterans of World War II.
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STUDENTS: 428,165
The University retained Mr. Eero Saarinen in June of 1951 to develop plans for a new campus to be built on land being acquired north of the Huron River. The progress of planning in May of 1953 is illustrated. General land use and circulation patterns were already established. The U.S. 23 freeway was ultimately constructed further to the east.
The Importance of the Phoenix Project

Ruthven called the Phoenix project “the most important undertaking in the University’s history.”

The University was paying tribute to the sacrifices of its men and women during the war by accepting the momentous responsibility of studying the peaceful applications of atomic energy.

Even President Eisenhower highlighted the importance of the Phoenix Project: “Few causes are more urgent today and more noteworthy of your support. In war or in peace, the atomic research being done at the University of Michigan will strengthen America.”
MMPP # 10 The Decarboxylation of 2,3-Dioxypyrrrolidines (continued)

Vaughan, W. R.; Perry, Jr., Randolph
"Racemization in the Camphene Hydrochloride-Isobornyl Chloride Rearrangement"
J. Amer. Chem. Society, 75, 3168 (1953)

MMPP # 11 Study of High-Energy Cosmic Rays

Glaser, Donald A.
"Some Effects of Ionizing Radiation on the Formation of Bubbles in Liquids"

Glaser, D. A.
"Progress Report on the Development of Bubble Chambers"

MMPP # 14 Study of the Decay of Rubidium-87

MacGregor, M. H.; Wiedenbeck, M. L.
"The Decay of Rubidium-87"
Phys. Rev., 86: 420-421 (May 1, 1952)

Lu, D. C.; Kelly, W. H.; Wiedenbeck, M. L.
"Summing Studies of the Gamma Rays Following the Decays of Ba 131, Se 75, & Ru 106"
Phys. Rev., 97, No. 1, 139-142 (Jan., 1955)
Plan Four Phoenix Project Researches

FOUR research grants, totaling $6,400, have been assigned to University faculty members from the Michigan Memorial Program—The Phoenix Project.

A grant of $2,000 was made to Dr. William H. Beierwaltes, Assistant Professor of Internal Medicine, for research on radioactive iodine. Another award of $2,000 was made to Dr. Robley C. Williams, Associate Professor of Physics, and Dr. Robert J. Lowry, Assistant Professor of Botany. They are using radioactive tracers in studies of plant chromosomes and plant virus.

Two grants of $1,200 each were made to Dr. Christian S. Rondestvedt, Jr., and Dr. Wyman R. Vaughan, both Instructors in Chemistry. Dr. Rondestvedt will conduct a study of the "Mechanism of the Dakin Reaction" and Dr. Vaughan of the "Mechanism of the Rowe Rearrangement."
Dr. Edgar A. Kahn, Dr. William R. Correa and Dr. Robert G. Farris, all of the Medical School, have been responsible for the brain tumor location studies. Utilizing the "tagged atom" technique, these investigations may pave the way for new and even more promising discoveries that will relieve great human suffering.

The utilization of radiation to preserve foods has been intensively investigated by Professor Lloyd E. Brownell, of the College of Engineering, and solutions to some problems of appearance and flavor change appear to be at hand. Already various specimens of foods, such as beefsteak, milk and some vegetables, have been irradiated and remain unspoiled in sealed containers at room temperature. Control samples not subjected to the irradiation deteriorate normally and provide a vivid comparison to the unspoiled specimens. In this same line, a fundamental study on the inactivation of bacteria and molds by radiation has been carried out by Professor Carl A. Lawrence with very promising results on such problems as drug sterilization.