UCRL-JC-131048
PREPRINT

A Man and His Contribution to Radiological Protection—A Tribute

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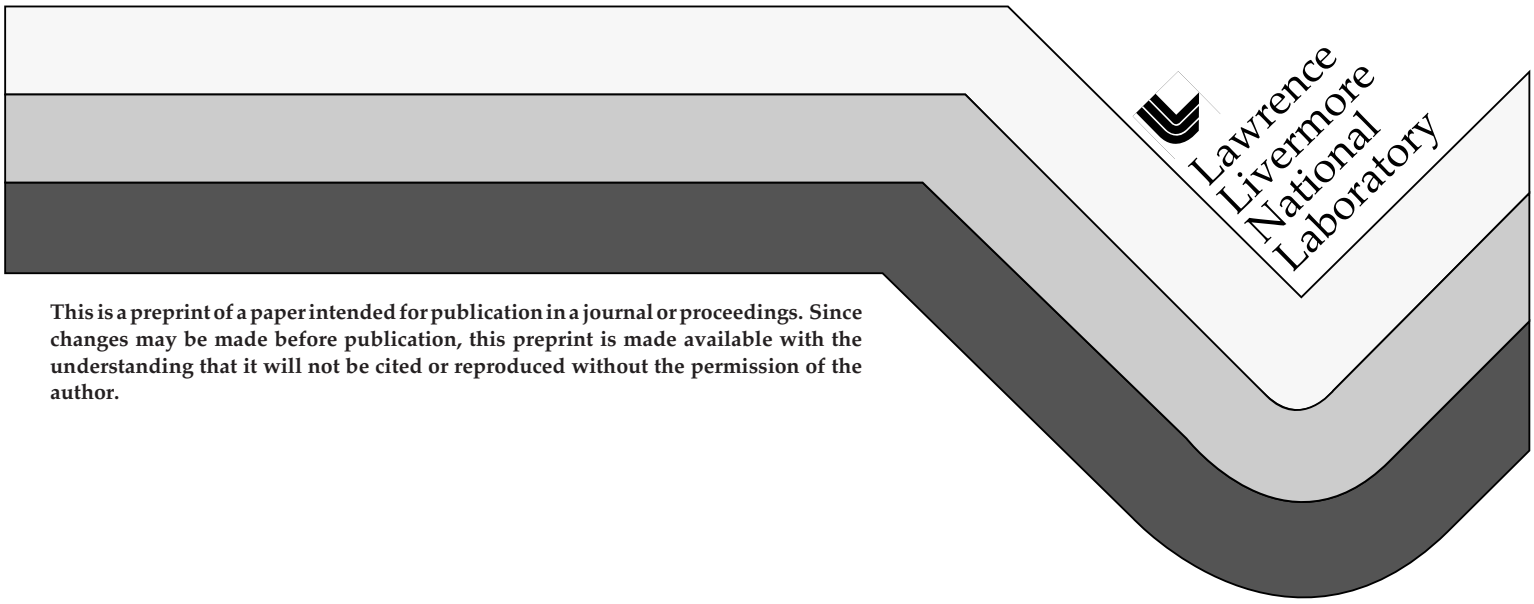
This paper was prepared for submittal to the Accelerator Section Session
Health Physics Society Annual Meeting,
Minneapolis, Minnesota
July 14, 1998

July 1998



Wade Patterson 1967
Head, Health Physics Department
University of California Radiation Laboratory

His life was gentle, and the elements
So mix'd in him that Nature might stand up
And say to all the world, "This was a man!"

Julius Cæsar Act V
William Shakespeare (1599)

Introduction. Henry Wade Patterson died in Lakeview, Oregon, on 7 October 1997. With his passing, we lost not only one of the most significant figures of the health physics profession but a most personable colleague and friend. His career at the University of California, both at Berkeley and Livermore, spanned five decades and he was generally regarded to be the first professional accelerator health physicist. So significant was our loss that more than a dozen local, national, and international newspapers, magazines, and scientific journals carried obituaries.

On 18 April 1998, the Northern California and Sierra-Nevada Chapters of the Health Physics Society paid tribute to Wade at the J. Newell Stannard Lecutres held in Incline Village, Nevada. Wade was active in both chapters. At that meeting, Wade's name was joined with another of the great personalities of public health—Merril Eisenbud who also died last year. Although it might be said that Merril Eisenbud and Wade represent opposite extremes of the spectrum of the great members of our profession—one a learned scholar from academia, and the other a self-trained operational health physicist—it was nevertheless fitting that their names were joined in this way because their paths intersected several times throughout their professional careers, and both held a high regard one for the other. Both were interested in high natural radiation areas around the world; the energy spectrum of neutrons emerging from the shield of high-energy accelerators; and the limitations in the power of epidemiological studies in understanding the health effects of humans exposed to ionizing radiations.

It has been nine months since Wade died. And it is particularly fitting that we of the Accelerator Section of the Health Physics Society, of which Wade was both a co-founder and first President, pay tribute to his memory and career.

In paying this tribute, I cannot be entirely objective and must declare a special interest. In this matter I cannot be neutral, for Wade was a most dear friend. Many years ago at dinner, perhaps after a few glasses of wine, Wade told Mavis, my wife, that he regarded me as a younger brother rather than as a co-worker. That is a compliment that I have held close to my heart ever since.

Wade as a Young Man. Wade, named after a favorite uncle and as he preferred to be known, was born to a military family on 28 July 1924, in Bishop, California. During his formative years, he traveled widely around the United States with his family as his father's postings demanded. During one of these tours of duty, Wade lived in Sitka, Alaska, where he earned a little pocket money as a tour-guide. One of his "customers" was the well-known Ripley of the internationally known news column "Believe it or Not!"

As a teenager, Wade moved to Lakeview, Oregon, where his father, a civil engineer, was assigned to assist in the construction of the post office. There, he attended high school, established his love for the Oregon high desert, and met Lois, his first wife.

Wade served with the U.S. Army Air Corps in Europe during the Second World War flying missions over Germany from Northern Italy. Many years later, it was often an item of speculation at dinner-table conversations as to whether Wade had bombed the young girl Alvina ("Bizzi") who at that time was growing up in Munich and who was to later became his second wife.

Wade and I discussed the bombings during this time. Both my wife, Mavis, and I had experienced the air raids from the other end—in London and Portsmouth. I had also seen first hand the devastation of the allied bombings of Hamburg and Cologne. When I offered the opinion that the accuracy of the bombing was poor, Wade was miffed with me. I quickly retreated and assured Wade that I was sure he was a most precise bomb-aimer.

In telling this story to Wade's family last year, I learned that Wade had once related an amusing anecdote. It seems that during his training somewhere in the mid-West things had not gone according to Hoyle. During target practice, Wade had released a bomb and was following its passage down towards the target. As he leaned increasingly forward to watch the bomb's descent as the plane flew on, he inadvertently brushed the bomb release-mechanism and another bomb—this time errant—sped its way earthward. How I wish I had known this earlier! I might have won a drink out of Wade on a bet!

Wade Patterson—University Man. Wade's professional career spanned five decades and was entirely spent at the University of California, Berkeley. He was a labourer and part-time employee at Lawrence's Radiation Laboratory and an undergraduate at Berkeley, where he majored in anthropology. Upon graduation, he served on the staff of the Radiation Laboratory, then in senior management positions at both Berkeley and Livermore National Laboratories.

University of California Campanile.

Wade's interest in anthropology surely was a felicitous choice for a nascent health physicist who was to be entrusted in determining the effects of ionizing radiation to Man ("The proper study of mankind is man," Alexander Pope, *Essay on Man*). In his memoirs, he tells how his imagination was particularly stirred by the lectures of Professor Ronald Olson which "gave Inca and Mayan civilization a startling reality" (Patterson 1995).

He loved the Berkeley campus, with its oases of quiet beauty in the midst of a roaring city. Even today, despite the encroachments of ever more development, one can still find idyllic spots free of noise and people where one can refresh the soul by quiet meditation (and one should note, because it is Berkeley, *without* benefit of marijuana).

Mimosa.

View of Campanile at sunset.

Wade admired all that the University could bring to life: its scholarship and intellectual vigour, its melting pot of cultures, its music, its political discourse and social activism. He welcomed controversy and strongly believed that of all places the University was the place where such issues could be examined rationally with intelligence, calm, and the benefit of obtaining significant information. In his memoirs, he reflected sadly and somewhat wistfully on the decline of courtesy in the manner in which controversial debates are now conducted. He compared the polite hearing given to Paul Robeson in the early 1950s with the manner in which William Shockley was shouted down, two decades later, and

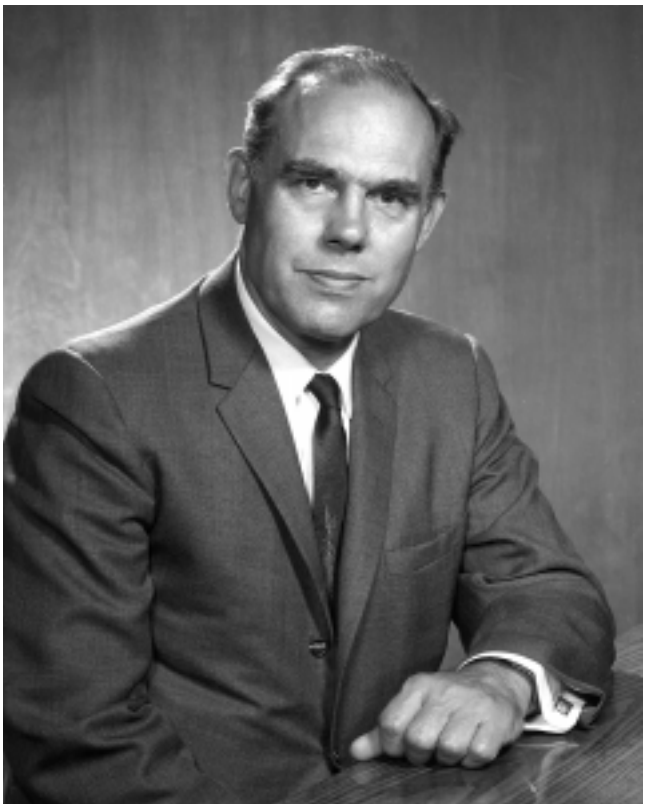
not allowed to enunciate his ideas because they were viewed as controversial. "In Berkeley now," he writes, "those who express views that are different from a certain perceived correct position are rejected immediately, vociferously, decisively, and even physically. No activity, . . . is found acceptable if in any way it is seen to be connected with nuclear energy or weapons."

University of California marching band.

Not least, Wade loved the University's athletic competition with its concept of the "student-athlete" as yet untainted by "professionalism." Several times we went together to witness that great Bay Area tradition, the autumnal slaughter in celebration of the vigour of youth known as the "Big Game" between Cal and that other great University (Stanford) just across the bay from Berkeley.

A Cal football game.

WADE PATTERSON AND BURTON MOYER. No one had a greater influence on Wade's professional life than did Burton Moyer as supervisor, mentor, role model, and friend. To understand Wade, one must know a little about Burton Moyer.



Formal portrait of Burton Moyer taken in 1967, when he was chairman of the Physics Department at the University of California, Berkeley.

Professor Moyer was a most distinguished physicist held in high esteem by many eminent scientists. Pief Panofsky regarded him very highly, both as a man and as a physicist and has written of him:

> After the war, responsible radiological protection was greatly promoted through the efforts of Burton J. Moyer, who managed to be a highly productive experimental particle-physicist, while taking responsibility for radiological protection (Panofsky 1994).

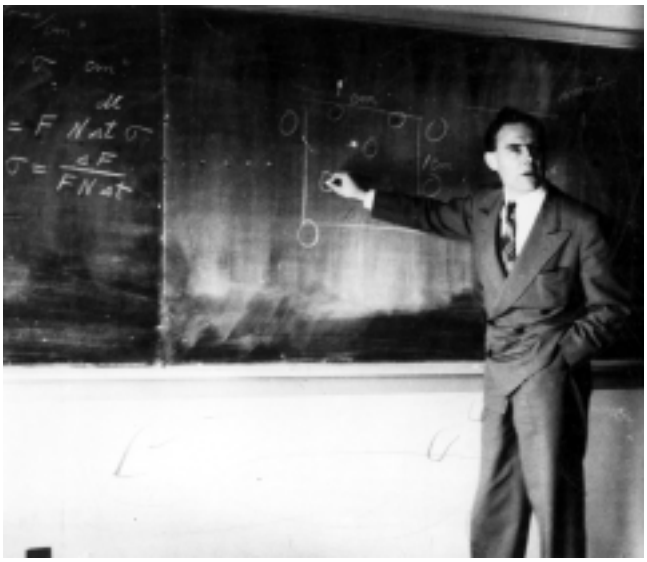
Segrè, who was known to be a stern critic, in describing Moyer's career and his decision to take up health physics wrote:

> . . . Then papers on Health Physics appeared. Why? To serve his fellow physicists Burt assumed a new, heavy load; the organization and supervision of health physics for the Radiation Laboratory. This work was technically difficult because the radiations were in a new energy region and their measurement and evaluation presented new problems. The work was of vital importance for the safety of his

colleagues in the Laboratory. It was a job not coveted by anyone, but as long as Burt was in Berkeley he silently, efficiently, and proficiently carried it on (Segrè 1973).

It was the character, however, of Moyer the Man that most influenced Wade. Moyer was an elder in the Presbyterian Church. Emilio Segrè, who was not a believer and a shrewd and tough judge of human nature, writes:

> . . . I have met truly religious people, in whom religion inspired the noblest conduct. Two such saintly men come to my mind. One was a Catholic priest, Don Nello del Raso, . . . the other was Professor Burton J. Moyer (1912–1973), who was for a time my colleague. As a young man, he had wanted to be a Protestant missionary and trained for that calling, but the war made him into a superior physicist. He worked at the Radiation Laboratory in Berkeley, and in due course played a major part in the discovery of the neutral pion. However, his real desire was to help his fellow men. Moyer became head of the physics department at Berkeley at the time of the worst student unrest, and he was one of a handful of people who managed to gain the confidence of both the administration and of the rebellious students. When things quieted down, he went to India to help in the setting up of a technical institute there .□.□. I felt deeply attracted to him in spite of our greatly different backgrounds (Segrè□1993).



Burton Moyer lecturing.

To his students and protégés Moyer became "The Father of Accelerator Health Physics," a term that I think is now universally accepted. He made many seminal decisions that were to shape the work of accelerator health physicists around the world. Most importantly, Moyer emphasized that the physical characterization of the accelerator radiation environment—in terms of the type of radiations and their angular and energy distribution—was to be preferred in radiation protection at particle accelerators in that it provided an unchanging basis which could be used to interpret the subsequently improving, and thus ever-changing, biological information (Moyer 1952, 1954). He is today often remembered for the "Moyer Model." First used to design the shielding for the improved Bevatron, the model has been "fine-tuned" in some respects and has served in the design of many, many accelerator shields (Moyer 1962).

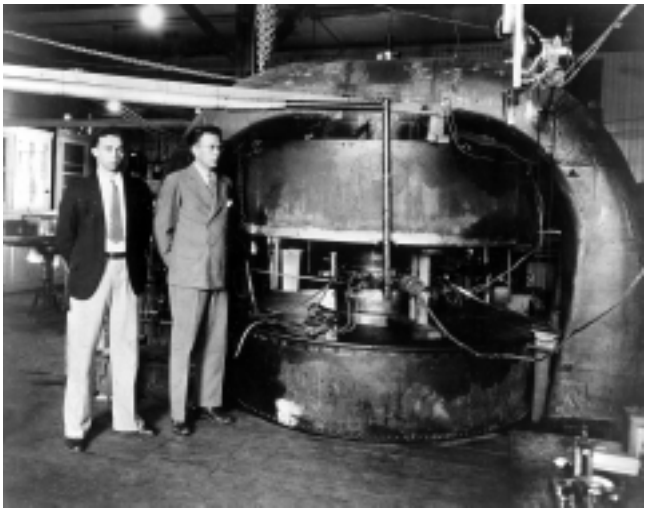
By his establishment of an independent health physics group with which accelerator designers could consult on matters of accelerator radiation safety, Moyer set a pattern followed by Accelerator Laboratories around the world.

Wade's respect for Burton Moyer influenced his entire career and later inspired him to work to establish the Moyer Scholarship. This latter endeavour exemplifies Wade's dogged will and determination. Surprisingly, when the Northern California Chapter made an offer to the Board of the Health Physics Society to fund the Moyer Award as a national scholarship there was resistance. Neither Wade nor I understood why. Wade persisted and demolished the politics. And today, the Moyer Award is one of the most highly regarded awards for education in radiological protection.

Wade Patterson—The Scientist.

Wade arrived at the Radiation Laboratory ("the RadLab") of the University of California, Berkeley, at the most felicitous of times. Incredibly, despite the enormity of events and long duration of the Second World War, it had only been 14□years since Lawrence and Livingston had first published an account of their invention of the cyclotron. The deflection of accelerator technology to the war effort had proved a great military and political success. These were the days when the heady successes of science were generously supported by a grateful Congress and the na-

tion. Relations with the funding agencies were friendly and conducted with mutual respect. Scientists from the National Laboratories were recognized as experts in their disciplines and as national resources. How different from today where the relationship between scientists and regulators seems to be one of confrontation!



Ernest Lawrence and Stanley Livingston standing by the 27-inch cyclotron constructed on the Berkeley campus.

One's first impressions on arrival at the RadLab are the glorious and spectacular views from "the hill," as it is fondly known to the Berkeley campus, doubtlessly unmatched by any national laboratory anywhere in the world.

A view of the RadLab and Berkeley campus from the Berkeley Hills. The dome of the 184" cyclotron building is clearly visible. The Bay Bridge and San Francisco may be seen in the background (about 1978).

A view of San Francisco from the RadLab at night (1978).

In 1947, Ernest Lawrence asked Burton Moyer to take responsibility for accelerator radiological safety and Wade was invited to join the new Health Physics Group, which he was later to lead from 1965 until 1973.

Wade could draw on eminent scientists for leadership, support, and counsel. From the very beginning, even before the Manhattan Project, there had been an interest in the biological consequences of exposure to the radiations produced by the early accelerators. At Berkeley, the Lawrence brothers pioneered studies of the radiological effects of radiation using accelerators. Many of their colleagues shared this interest. In the late 1940s and 1950s, a group of scientists who congregated at the RadLab made significant decisions that greatly influenced the future of our profession. Among them were the Lawrences, of course; Edward Lofgren; Edwin McMillan; Burton Moyer; Wolfgang Panofsky; and Cornelius Tobias. It is natural, therefore, that the "Birthplace of the Cyclotron" should also become the "Birthplace of Accelerator Health Physics."

The Patterson-Moyer group established the model which most accelerator laboratories were to later follow. Some of the group's members (Joe McCaslin, Al Smith, Lloyd Stephens, and Roger Wallace) will be familiar to many in this audience. This wonderfully diverse mix of able scientists and technicians was eminently capable of forging the dreams of theorists into working instruments so vital to their mission. With such a group of highly motivated and talented people, the achievements of the RadLab Health Physics Group became almost legendary.

The RadLab Health Physics Group (1967). From left to right: Joe McCaslin, Lloyd Stephens, Wade Patterson, and Al Smith.

In 1957, in New York, the first important conference on the Shielding of High-Energy Accelerators (Solon 1957) was held. By this time, Wade's work at Berkeley had established him as one of the world's experts in the field and he was invited to attend this conference. Many of those in attendance were later to become laboratory directors, leaders of accelerator design teams, and professional accelerator health physicists. They left the conference determined not to repeat the radiological safety mistakes made with the design and construction of the early proton synchrotrons, the "Cosmotron" and the "Bevatron."

Pief Panofsky has written a shrewd analysis of the development of the accelerator health physics profession up to about the time of the New York meeting in the following terms:

> During those days (immediately after the Second World War), the principal calculations relating to accelerator radiological protection were more than likely done by the responsible physicists rather than separate specialists. For instance, Norman Ramsey at Harvard University personally did many of the shielding calculations for the Harvard cyclotron, and I had the privilege to calculate electromagnetic shower propagation and the resultant track length for photonuclear processes in shielding for the proposal to construct the Stanford two-mile linear accelerator. But the burden of accelerator radiological protection became sufficiently heavy that specialists were needed; in consequence, they were grown from within the accelerator and particle physics communities after the war (Panofsky 1994).

I believe we can identify the New York meeting as the time when the health physics profession achieved its separate identity, with Wade Patterson as the first of the "new breed" that Panofsky describes and thus the first professional health physicist.

A review of his bibliography reveals that, for the 26 years from 1947 to 1973, Wade devoted the bulk of his professional energies to the solution of a great number of diverse accelerator radiation problems, and consequently gained international recognition as an accelerator expert. For example, he was a member of the first team to design and perform high-energy neutron shielding experiments; develop an entire armory of radiation detectors; and explore and analyze radiation fields of the early cyclotrons and the Bevatron. The team also identified and quantified Skyshine; theoretically and experimentally explored the relationship between source strengths of fast neutrons and the resultant and thermal neutron influence inside concrete accelerator vaults; and assessed the radioactivity induced in the concrete of accelerator rooms and its magnitude.

In 1966, Wade and his team designed and executed the most ambitious accelerator shielding experiment to date (Gilbert et al. 1968). These measurements were made at the 28 GeV CERN Proton Synchrotron; however, the data were so extensive that they still have not been entirely analyzed. The database obtained from this experiment was invaluable to the design of the third-generation proton synchrotrons (the 300 GeV SPS at CERN and the 200 GeV FermiLab synchrotron).

At his "so-called" retirement from the Lawrence Livermore National Laboratory in 1984, Art Toy, Department Head of the Hazards Control Department, said of Wade that during this time he "knew more about accelerator health physics than any other person then alive."

What is not so generally known is that Wade also made his mark in the broader field of radiological protection. For example, he was involved in some of the first measurements in high natural radiation areas around the world (India and Egypt); examination of dental radiological procedures with consequent improved protection of staff and patients; evaluation of the incidence of cataracts in cyclotron workers; measurement of the energy spectrum of neutrons

produced in the Earth's atmosphere; nuclear weapons test fallout studies in the San Francisco Bay Area; and limitations in the power of epidemiological studies in understanding the health effects of humans exposed to ionizing radiations.

One of his more "glamorous" exploits was in dosimetry for the laboratory simulations of "eye-flashes" experienced by the Apollo 13 astronauts. In 1969, Edwin Aldrin and the other crew members of the Apollo Lunar Missions reported observation of eye-flashes during flight. These eye-flashes were most frequently observed during part of the ill-fated Apollo 13 Mission, when the module lost power and the astronauts were therefore well dark-adapted. Cornelius Tobias had previously speculated that such flashes might be observed and attributed them to the interaction of high-LET particles in the retina. An initial experiment with the 184-inch synchrocyclotron in 1970 in which Tobias exposed his eyes to neutrons supported this hypothesis, as seen in the photograph below.

The first of a series of Apollo 13 eye-flash experiments. Cornelius Tobias (under the black hood for dark-adaptation) positions his head in the neutron beam of the RadLab 184" cyclotron to observe eye-flashes induced in the laboratory (*Magnet,* December 1970).

Wade, as leader of the Health Physics Group, was actively involved in determining the dose to the eye and head of human subjects.

Whenever a dinner table conversation turned to serious topics, such as the great confusion in the quantities and units used in radiological protection, Wade loved to tell of an amusing incident during the Apollo 13 experiment. One senior participant, intent on obtaining his own estimate of dose and not entirely trusting of the health physicists, appeared with a quartz-fibre electroscope partially immersed in a beaker full of water. After taking a reading in the neutron beam, he was heard to ask a colleague, "How many rep does that correspond to"? (For those who miss the point the "rep," roentgen-equivalent-physical, was a unit of radiation exposure introduced in 1948 and long since abandoned by 1970). As I write this, I can hear Wade's belly-laugh as he told this tale.

In 1973, Wade moved to the Lawrence Livermore National Laboratory in Livermore. His responsibilities as Head of the Hazards Control Department were more diverse than at the RadLab in Berkeley and largely administrative in character. However, he ran the department with great aplomb and was much loved by his staff.

After his official retirement in 1984, Wade remained in harness continuing to work on a variety of projects, bringing to them his broad experience and diligence, and his scientific and analytical skills. Wade was never afraid of controversy. He chastised the radiation protection establishment for its poor science and excessively conservative modeling. Characteristically, his last significant work was to produce a compilation of radiation dose-effect data that he believed would prove helpful in discussing the scientific basis for the establishment of radiological protection standards (Patterson *et al*. 1997).

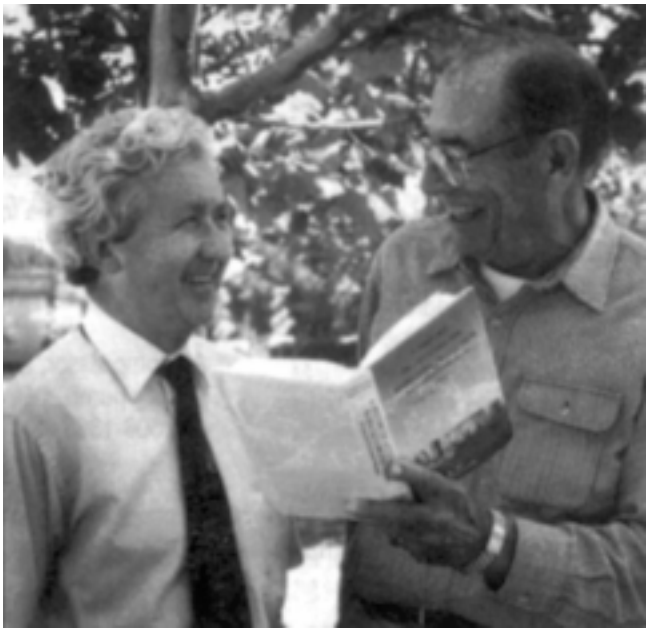
Wade Patterson—The Educator. Wade held a deep-rooted belief that the health physics profession should hold high standards of competence and integrity, and worked tirelessly to this end. He worked steadfastly to establish a certifying board and was one of the first certified health physicists. He took the setting of high professional standards very seriously, working hard on many committees, serving as a proctor, setting examinations, and sitting on review panels to establish a sensible and credible examination system. He also served on the American Board of Health Physics from 1968 to 1974 and as Chairman for the last four of these years.

From 1967 to 1971, Patterson organized the Berkeley Accelerator Health Physics Training Course. Over a hundred scientists, mostly from the United States but many from abroad, attended this course. With a cadré of lecturers drawn from the RadLab, as well as invited lecturers from accelerator laboratories

around the world, this course was one of the most effective means of widely dispersing the collective experience of accelerator radiation safety. It might be said that most of the first-generation accelerator health physicists were deeply influenced, directly or indirectly, by this course. The experience gleaned was distilled into the well-known text "Accelerator Health Physics" published in 1973.

Much later, Wade turned his attention to the training of technologists and was very supportive of the National Registry of Radiological Protection Technologists. In recognition of his efforts, he was awarded the Arthur F. Humm Jr. Award in 1992.

It was with this interest in the human aspects of the health physics profession that, about four years ago, Wade Patterson and I embarked on the task of collecting the memories of people who had been engaged in the study of accelerator radiation phenomena, mostly since the end of the Second World War. It was one of the most delightful experiences of both our long careers—more than 90 years between us. Thirty-four accelerator health physicists from around the world generously gave of their time and provided us with a fascinating olio of personal memories, technical and scientific discussions, and historical perspectives.



Wade Patterson and Ralph Thomas with their book "History of Accelerator Radiaton Protection" (photo from Lawrence Livermore National Laboratory *Newsline*, August 5, 1995).

Professional Man. Patterson was an energetic worker for his profession serving in many senior posts and committees of the U.S. Health Physics Society. He served as President of the Northern California chapter in 1970 and as a two-term member on the Board—the first from 1966 to 1967, and the second from 1969 to 1972. As Editor-in-Chief of the *Health Physics Journal* from 1977–1982, he showed great innovative instinct by introducing a team of associate editors. At the time of his death, he was a member of the Nominating Committee. For this work, he was much honored by the Health Physics Society (Meritorious Performance Award, 1983; Distinguished Achievement Award, 1986); the American Academy of Health Physics (William McAdams Award, 1990), the National Registry of Radiological Protection Technicians, and the U.S. Department of Energy. He was a Fellow of the Health Physics Society and the American Association for the Advancement of Science.

Wade Patterson—The Man. If one word described Wade Patterson it would be "integrity." He was as good as his word. To some, he was a conservative figure who, in many respects, was ahead of his time. Through the Health Physics Group at Berkeley passed many students and guests of all countries, race, and religion. Wade supported many women in advancing their careers in a male-dominated discipline. He did this instinctively, not because of any imposed rules, but because it was the human and decent thing to do.

Wade was immensely proud of his five children, all of whom are living successful lives. Stephen works for an airline as a cabin attendant; Donald is a surveyor living in Montana, and Bruce is a pilot living in Washington. Charles is a professional athlete, and Janet, the youngest, is a hotel manager.

There is an interesting anecdote worth telling concerning Janet. When Janet was expected, I remember Wade bemoaning his fate to me that, while he had produced four fine sons, all of whom he dearly loved, he nevertheless yearned for a daughter but there was just no chance—the odds were stacked against him. I reminded him that, in the absence of any pathology, the chance of a baby being a girl was slightly greater than of being a boy. It was clear to me that while Wade's mind accepted this argument—he had, after all, taken statistics courses at "Cal"—his heart told him otherwise. The day after Janet's birth in August

1972, while on holiday with my family in Pacific Grove, I received an excited telephone call from Wade. "By Golly, Ralph" he said "you were right, it's a girl!" Wade's respect for the predictions of the binomial distribution deepened enormously at that very moment.

Beyond his profession, Wade had many facets to his personality and diverse interests. His youth had given him a great enthusiasm for travel, and he was a mine of information about his native California. He loved the outdoors, no doubt a result of growing up in the Western United States in its majestic and almost painfully beautiful scenery. He was an enthusiastic hunter; he displayed a keen interest in public affairs and politics and was widely read.

There is an amusing anecdote about Wade and his hunting that he told me in Lakeview the last time I saw him. It beats all "the one that got away" stories that I have ever heard. Many years ago, he and Gordon McPeak, a friend from the RadLab, went North to hunt for elk. After many patient hours waiting, they saw an Elk emerge from the forest across the meadow and up wind of them and began a stately walk across their line of fire. Gordon was slightly ahead of Wade and got off the first shot. The Elk appeared not to have been harmed. McPeak fired a second shot, again with no apparent effect, and in doing so opened up a shot for Wade. Wade fired and the Elk immediately dropped to its knees. "That's my Elk!" said Wade. McPeak wasn't so sure. He walked over to the animal and searched for the fatal bullets and found two—both his own. "No Wade, you're wrong! That's my elk," he said. Wade, unmoved said, "Ah! But Gordon, I used high velocity bullets. You wouldn't find them in the carcass. The bullet would have passed right through."

His passion for hunting I never fully understood. I recall in November 1970 my curiosity got the better of me. We were both in Idaho Falls and Wade had arranged to go duck-hunting and fishing at the end of the week. I asked if I could accompany him as an observer, feeling decidedly an advocate for the hunted.

The first day we set off Southwest, down the Snake River to the American Falls Reservoir, about a 60-mile distance. We headed for a "secret fishing spot" known to Jan Cusimano. We fished all day, truly without a single bite. Evidently, the spot was so secret that even the fish didn't know about it, and it took several months for Jan Cusimano to live this experience down.

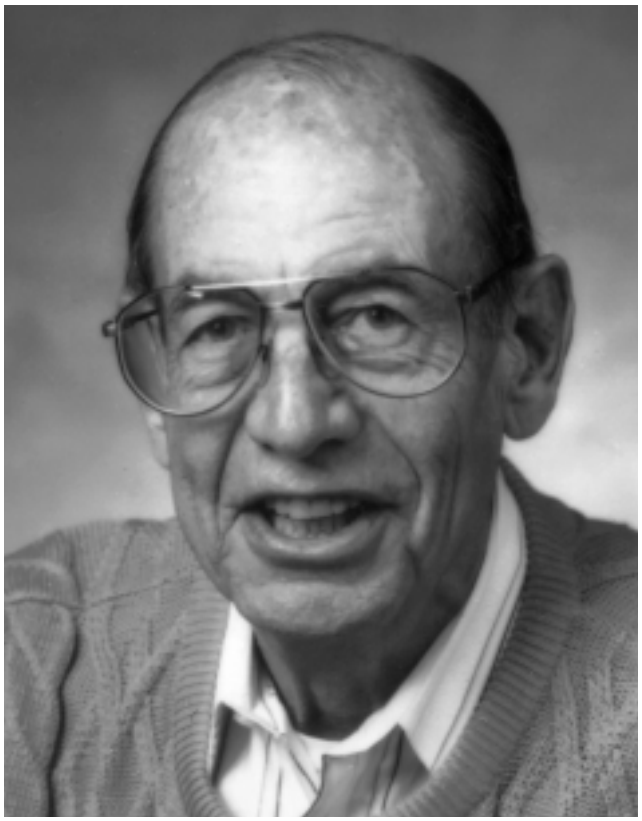
Not deterred by this misadventure, the very next day we set off in darkness and drove about 60 miles North, near the Camas Wildlife Refuge. Space does not permit a full description of all the antics of duck decoys, bird calls, and the like. As the day wore on, hip-high in freezing water, I prayed that the day would come to a quick end. It seemed to me that every duck that flew over us took one look at our decoys and veered away at Mach 1. In all, a total of about five shots were fired all day but alas no bag of ducks to be taken home to be prepared *à la orange.* By sunset, I recall being miserably cold and the best event of the day was a slug of most welcomed Jack Daniels from the bottle.

With these experiences under my belt, my political views changed. I was no longer anti-hunting—I pitied the poor hunters!

Wade the fisherman.

The Last Days. Wade returned to Lakeview, Oregon, to spend the last couple years of his life in that wonderful scenery of the Oregon high desert. Lakeview is one of those small Western towns where the memories linger long after one leaves. Everyone knows one another and is incredibly friendly. People greet you in the street, look you in the eye and engage you in conversation; and neighbours are immediately there to help in time of need. It is what every neighbourhood in every big city should be, but is not.

Wade's illness took a rapid course. In January 1997, at the San Jose meeting of the Health Physics Society, Wade complained of back ache. We discussed it and, both being sufferers, agreed that "nursing it along" was all that was needed.



Wade in his last year.

In July, Wade was at the Health Physics Society meeting in San Antonio, Texas. He was experiencing some pain then and had to cancel appointments. Mavis and I were in England for all of August. When we returned, there was an email message which said that Wade was seriously ill with metastatic cancer of the spine.

When the facts of his medical condition were clear to him, Wade declined radical therapy because in his case success was problematical.

A couple of months before his death, he sent some of us a letter "running his colours up the flagpole" or, if you will, his version of Martin Luther's "Hier stehe ich, ich kann nicht anders. Gott helfe mir." In it, he stated clearly and succinctly his views on those aspects of life we hold to be most important. He knew exactly where he stood and in what he believed. He was a Presbyterian and a Republican. His life had been good and he was extremely proud of his career and family. He was clear headed and knew what he faced. May God give us all similar grace when our time comes.

Mavis and I traveled to Lakeview to see Wade on 23 and 24 September. It was a great comfort to know that he was in a wonderfully caring annex to the local hospital with a calm and serene atmosphere. We saw him twice. He was frail but in good spirits and was able to talk with us for an hour or so. We talked of the good times, had a few laughs, and left with tears in our eyes.

Wade faced his last painful weeks calmly, in a matter-of-fact manner, and with great courage. During this difficult time, the support of his family and many friends was a source of great comfort to him. Wade died in Lakeview on 7 October 1997. He is survived by his five children Stephen, Donald, Bruce, Charles, and Janet and by four grandchildren.

With his passing, the Health Physics Profession lost one of its most significant figures. We shall not see his like again.

Postscript. Several of Wade's friends from Berkeley and Livermore drove the 400 miles to Lakeview to attend his funeral on 17 October. The next day, in a somber mood, Mavis and I headed home. We turned South at Burney through Lassen National Park. Winter was on its way. There had been a fresh fall of snow, and the snow crept right up to the roadside. The windward side of the mountain was blanketed white, its bulk set against a clear blue sky. The bright sunlight shone through the golden aspens with their leaves shaking in the breeze. If there is a Paradise, this must be very much like it. We drove on listening to Fauré's glorious and optimistic requiem and thought of Wade.

Pie Jesu, Domine
Dona eis requiem:
Dona eis requiem sempiternam

Father's Day
21 June 1998

Acknowledgement

Work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract W-7405-ENG-48.

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