

Leo Szilard: Giving peace a chance in the nuclear age

An honorary doctorate from Brandeis University provides a fitting epitaph: 'A prophet ahead of his time, yet a victim of its maladies.'

Barton J. Bernstein

The idea came to him one day in September 1933 as he crossed Southampton Row near the British Museum in London. What Leo Szilard imagined so brilliantly that day was a transmutation of chemical elements in a nuclear chain reaction that could someday produce enormous explosive power. Szilard's concept unrolled in his mind five years before fission was discovered, nine years before the first self-sustaining reaction was achieved and 12 years before the atomic bomb was dropped.

To keep the idea out of the hands of Hitler's scientists, Szilard, who had emigrated earlier that year from Germany, assigned the patent rights to the British Admiralty to ensure its secrecy. In 1938, Otto Hahn and Fritz Strassmann split the uranium atom. Eight months later, fearing that German scientists were already working on an atomic bomb, Szilard drafted a letter for Albert Einstein to sign and send to President Franklin D. Roosevelt. The intent of the letter was to alert the President to the potential development of nuclear arms.

"If the A-bomb project could have been run on ideas alone," said Eugene Wigner, like Szilard a theoretical physicist born and educated in Hungary, "no one but Leo would have been needed." Szilard possessed such originality that he evoked superlatives—and possibly even hyperbole. Szilard also was capable of arousing annoyance and anger. This was often the reaction

of military brass hats and science administrators to his prodding and provoking manner. At times he offered so much unsolicited advice that General Leslie R. Groves, who headed the Manhattan Project during World War II, once wanted to imprison Szilard as a security risk. Groves's plan was thwarted by no less a figure than Henry L. Stimson, Secretary of War. In 1945, as the war was ending, Szilard infuriated some military and political officials by publicly opposing the use of nuclear bombs on Japan and resisting the course of postwar US policy, which, he argued, would lead inexorably to a nuclear arms race with the Soviet Union.

Even before the Trinity test at Alamogordo, Szilard had pleaded with Washington for international control of all atomic materials. Once the war was won, he devoted the remaining 19 years of his life to the cause of perfecting a "livable world"—one in which nuclear weapons would be controlled and ultimately eliminated.

By nature Szilard was restless, relentless, charming, eccentric and frequently bursting with enthusiasm about a new cause. An idealist, committed to improving the human condition in the shadow of the nuclear age, Szilard was a kind of one-man lobby for peace.

At various times in his last years he championed such concepts as world government, total disarmament and arms control. A pragmatist, he yielded to events by devising short-run solutions, including his preparation of rules for limited nuclear war and for reciprocal nuclear destruction of cities—a sort of early version of mutually assured destruction, known familiarly by the acronym MAD.

During the cold war of the 1950s Szilard helped promote the Pugwash movement, which brought together leading scientists from East and West to seek solutions to the problems

brought on by nuclear weapons. The Pugwash Conferences, financed by US industrialist Cyrus Eaton and named for the Canadian town where he had a summer home, began in July 1957, a month before the Soviet Union tested its ICBMs and three months before it launched the first Sputnik satellite. Although Szilard continued as a dedicated participant in the Pugwash movement, he believed that only smaller, informal meetings between Soviet and Western scientists, engaging in more open exchanges, could be truly productive.

Szilard had higher aims. He attempted to negotiate directly with Soviet Premier Nikita Khrushchev in the early 1960s. During the period, Szilard urged that a telephone hot line be installed between the Kremlin and White House and founded the Council for a Livable World, which he expected to lobby against the arms race and to support political candidates who endorsed that goal.

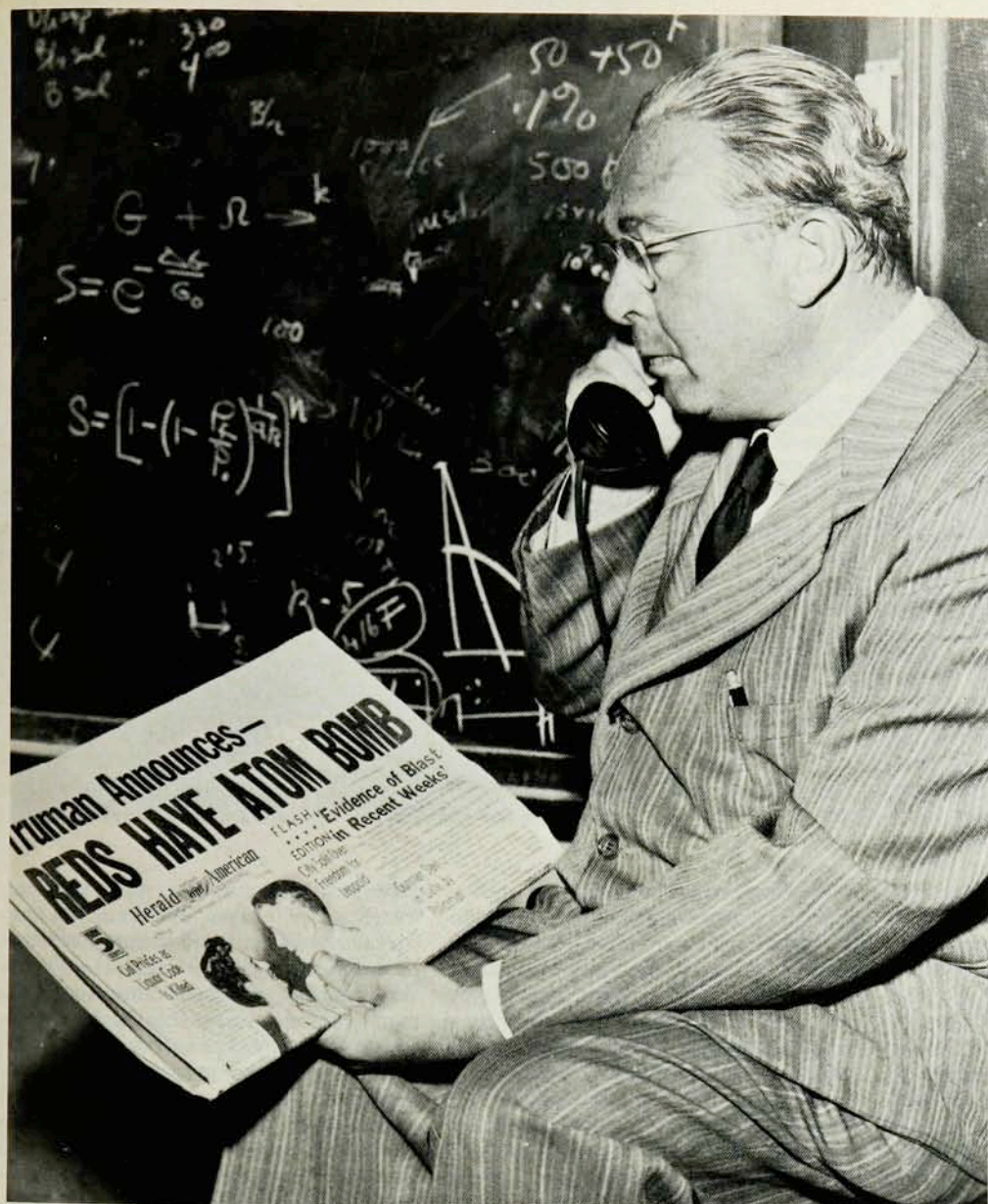
The superiority of scientists

Most of Szilard's projects contained goodly elements of intellectual elitism, principally of a scientific nature. Periodically he devised various schemes to create groups of the best and brightest to guide the nation out of the arms race or into a more stable nuclear balance. He believed in the superiority of scientists, extolled them for their capacity for objectivity and believed himself among the most preeminent.

He was a man of dazzling intellect, playful, abrasive at times, and obsessive. He delighted in twitting Army security officials and in operating somewhat outside established channels. He once wrote on a lengthy security form during World War II that his hobby was "baiting the brass." It did not endear him to the military.

He sought to push and prod Presidents, Secretaries of State and others at the pinnacles of power to endorse his

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The arms race began with the test of Joe I, the first Soviet atomic bomb, announced by President Truman on 23 September 1949. Thereafter Leo Szilard (at left) increased his activity to control the weapon he did much to create.

ideas. Contemptuous of physical labor, he had angered Enrico Fermi so often by his reluctance to do his share in the lab at Columbia University in 1939 that Fermi refused to work with him after their famous fission experiment was completed.

Like radium giving off luminescence, Szilard effused new ideas. He helped pioneer information theory. With Einstein, he designed a liquid-metal pump refrigerator. ("It howled like a jackal," a friend recalled, then volunteered that similar pumps were later used in breeder reactors.) Szilard probably was the first to conceive of the cyclotron and the electron microscope. He also shared a key patent for nuclear reactors. "Had he pushed through to success all his inventions," said Denis Gabor, a Hungarian physicist who became a Nobel laureate and Szilard's

longtime friend, "we would now talk of him as the Edison of the 20th century."

Unfortunately for science, Szilard published surprisingly little—only 29 papers, not much more than an assistant professor up for tenure today at a major American university. "He was as generous with his ideas as a Maori chief with his wife," claimed Jacques Monod, a Nobel Prize-winning biologist. Though a self-declared "man of ideas," Szilard lacked the personal discipline to pursue them to completion. He often dropped interesting concepts just as others were beginning to explore them. James Franck, a physicist on the Manhattan Project, once suggested only partly in jest that Szilard should be kept in a freezer and pulled out when great ideas were needed. Wigner, another close friend and Nobel laureate, called him "the most

imaginative man . . . I ever knew," and said that "no one [had] more independence of thought and opinion."

Szilard was also a man who believed steadily (his brother would say "stubbornly") in rationality and devised elaborate political schemes that denied emotions, mistrusted passions and often ignored much of the troubling stuff of national culture—habits, inclinations and patterns of behavior. Recognizing this shortcoming in Szilard, Einstein said in 1930 about the then 32-year-old Szilard, "he tends to overestimate the role of rational thought in human life."

Perhaps it was the strain of self-imposed rationality that led Szilard to be puckish, impish, even childlike. He once admitted that he became a scientist because "in some ways I remained a child."

During the last five years before his death in 1964, Szilard devoted himself mostly to political activities. He completed "How to live with the bomb and survive," a paper he wrote and rewrote over a few years, and published it first in the *Bulletin of the Atomic Scientists* in 1960. A year later his masterpiece of science fiction, *The Voice of the Dolphins*, came out to critical acclaim. He conducted negotiations with Krushchev, took up residence in Washington to influence policy during the Kennedy Administration and gave a series of college lectures that launched the Council for a Livable World.

Szilard became seriously ill with bladder cancer in autumn 1959. At first he delayed entering a hospital and postponed his x-ray treatments until he could finish two scientific papers on cell regulation of enzymes and on antibodies. He rejected major surgery, later explaining dispassionately that surgery did not represent a good cost-benefit choice. If the proposed surgery had been likely to give him ten more years at the price of a few months of great discomfort, he would have done it. "But the chances were not good," he said. So, he explained, he chose radiation treatments instead, "which certainly will not save my life but which gave me some hope that I will be able to work for some time." Ironically, after his death by a heart attack, the autopsy showed that the cancer had completely disappeared.

While he was a cancer patient in Memorial Hospital in New York City, Szilard delighted in entertaining visitors, often shocking them with his whirlwind activity, and in directing his physicians. "These radiologists don't know x rays," he asserted with intentional exaggeration. "I find myself having to give a course in radiology to these fellows. Anyway, I'm the chief consultant on my own case. It's quite fascinating." Exerting such control over his treatment, in which he was assisted by his wife, Gertrud (Trude), a practicing physician, was essential to Szilard, who normally rejected open dependence on others.

Despite the radiation treatments, Szilard believed that his bladder cancer would recur. "My chances are anything but good," he told a *Life* magazine reporter. "Say, six months to a year. I have plenty to occupy me in whatever time is left."

In the hospital he was finishing "How to live with the bomb" and parts of *Dolphins*, dictating his memoirs, writing letters to newspapers, directing some informal lobbying efforts, conducting television interviews, planning television debates on the arms race and world politics with Edward Teller, an-

Pugwash

Conferences were sponsored during the early years by Cyrus Eaton (at right), the Cleveland industrialist who made available his estate in Nova Scotia, near the little town of Pugwash, after the US government refused to grant visas for the first meeting to scientists from Eastern Europe. Szilard and Bertrand Russell were among those who backed Pugwash as a way of reducing superpower tensions.

other Hungarian emigré, and entertaining a flow of visitors. He handled all this with rumpled efficiency, dressed in a bathrobe and surrounded by a scatter of notepads, papers, letters and a tape recorder. When asked how he could conduct his affairs amid such confusion, he replied: "This hardly seems abnormal. I guess it's because I have spent so much of my time living in the rooms of hotels and faculty clubs."

Unsolicited advice

He also gave unsolicited advice to politicians. In April 1960, for instance, after noting that Hubert Humphrey's campaign for the Democratic Party's Presidential nomination was broke, Szilard proposed that John F. Kennedy should contribute \$10 000 to help his rival's campaign and inform Humphrey that he (Kennedy) would consider it unfair to win the primaries if his principal competitor ran out of money. Szilard suggested that Kennedy should not publicize the offer, and that it would be better just to let the story leak out. Kennedy sent him a polite, perfunctory note, saying he welcomed the comments "and will certainly keep them in mind." Szilard had clearly misjudged Kennedy and American politics, revealing what some would decry as innocence and naiveté.

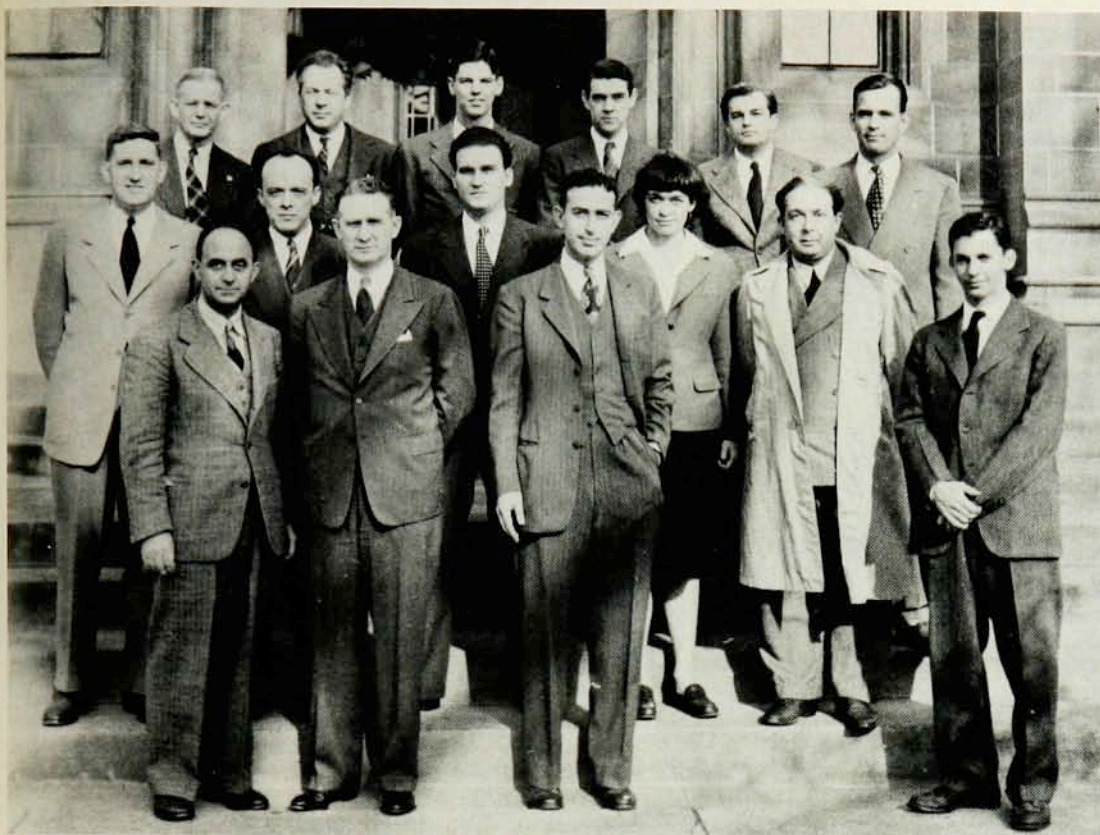
Szilard sometimes sneaked out of the hospital to attend meetings. In May 1960, together with Wigner, he re-

ceived the Atoms for Peace Prize, worth \$37 500 to each of them. At the ceremony, Szilard and Wigner, despite their longtime differences on the Soviet threat and the need for more weapons, made common cause in criticizing the quest for a test ban treaty. Each thought that the proposed system of inspection points would, in Szilard's words, "lead to friction." Szilard preferred his solution: Assemble the world's atomic scientists to work on methods of detection and offer a \$1 million reward to report any violations.

By early 1960, after many false starts and discarded revisions, Szilard's early thinking on "How to live with the bomb and survive" finally came together. It was a curious essay—perhaps a quintessential Szilard piece—for it was an amalgam of the prescient, the hopeful, the pessimistic and the overly rational. In it, he sketched some rules for the emerging nuclear stalemate he foresaw. As the United States and the Soviet Union each developed mobile ICBMs and thus virtually invulnerable second-strike capacities, Szilard thought it might be possible to stipulate ways of coexisting with the bomb. His overly mechanical and excessively rational solution called for each nation to define a "permissible threat" and even to work out guidelines for limiting nuclear war—with such a war, if it broke out, to be waged against evacuated cities in the enemy's country. Like

WIDE WORLD: S. BOJAR/INTERFOTO MTI





Fourth anniversary of the first nuclear pile was commemorated on 2 December 1946 when some members of Enrico Fermi's triumphant team posed for a photograph on the steps of Eckhart Hall at the University of Chicago. In front row (from left): Fermi, Walter Zinn, Albert Wattenberg and Herbert Anderson; middle row: Harold Agnew, William Sturm, Harold Lichtenberger, Leona W. Marshall Libby and Szilard (in raincoat); back row: Norman Hilberry, Samuel Allison, Thomas Brill, Robert Nobles, Warren Nyer and Marvin Wilkening.

many other strategists of the era, he wrote with the dispassion of a chess player, assuming that national leaders would not panic in crisis, accidents would not occur and communications would not break down.

Szilard grafted ideas from this essay into the title story of *The Voice of the Dolphins*. Written ostensibly after peace had been achieved in the last decades of the 20th century, the story emphasizes the wasteful cost of armaments, the dangers of an antiballistic missile defense system, the desirability of a no-first-use policy, the need to limit nuclear threats and to restrict nuclear retaliation to equivalent damage (a city for a city), the liability of allies, and various schemes for guaranteeing that nations would not cheat on arms control or disarmament agreements.

At the time, some of his proposals and perceptions were rather bold—his awareness of the dangers of an ABM system, his forecast of a stalemate in the nuclear arms race, his anticipation of the use of mobile ICBMs, his plea for no first use and his emphasis on avoiding an overwhelming counterforce capability because of the instability it created. Some of his other ideas, though characteristically ingenious, were not especially helpful—such as stressing that each nation, under an agreement, always had an interest in proving that it was not cheating and that citizens could be persuaded to

monitor honestly whether their own government was cheating.

In the title story, the dolphins provide the funding and even the advice that lead to disarmament and world peace. The story—in characteristic Szilard fashion—describes some negotiations and events, including narrowly averted wars, in elaborate detail but is troublingly vague in other respects. Often his narrative glides to happy events and conclusions, too frequently without adequate explanation.

Whimsy and hope

But, as he would have admitted, the tale expresses hope; it provides a guide, not a blueprint. A Soviet-American Biological Research Institute in Vienna studies dolphins, who love liver paste, help scientists win Nobel Prizes and lead them to discover a valuable substance that limits female fertility, thus checking the problem of soaring population—an issue that deeply troubled Szilard. The institute, made wealthy by this antifertility product, sponsors a television program to clarify political views and even devises ways to buy off politicians blocking peace initiatives. It is a tale of whimsy and hope, and the skillful avoidance of disaster. The story is, in important ways, similar to many Western utopian tales in which an act of will checks the otherwise inevitable slide toward cataclysm—in this case nuclear holocaust.

The fiction reveals much about Szilard: his cynicism about politics, his great respect for scientists, his neglect of human psychology, his delight in details and his fascination with convoluted plots, full of mystery and some genial deception. Indeed, at the end, the narrator admits that possibly the dolphins had not played any role. Could it be that the scientists had guided the world to peace? The story is, then, a powerful allegory, emphasizing the force of rationality, the forte of scientists.

Throughout the story, Szilard's great faith in scientists dominates. He laments "that scientists [are] on tap but not on top" in Washington. He declares that political issues are often complex, but that they are rarely anywhere as deep as scientific problems, particularly those in physics that had been solved in the first half of this century. He emphasizes that scientists, unlike politicians, seek the truth, and thus a critic need not ask why scientists take certain positions but only whether or not the positions are correct. And finally, in a burst of playfully expressed elitism, he asks: If in a democracy "one moron is as good as one genius, is it necessary to go one step further and hold that two morons are better than one genius?"

Most of the reviews were favorable, though Szilard grumbled that he could not prod the *New York Times Book*

Review to review it. So, he busily devised his own advertisements to promote the book. Some old friends sent him glowing tributes. Michael Polanyi, a Hungarian-born chemist who had known Szilard since the 1920s, suggested in a prescient letter: "Maybe . . . you will be remembered by these light-hearted fancies long after your contributions to science will have joined the melting pot of anonymity."

The book brought Szilard some fame and some money. It gave him a new platform for his ideas, and—to his delight—it was translated into Russian in the Soviet Union. Szilard himself called it to Khrushchev's attention during their meeting in October 1960 and later gave him a copy of the slim volume.

The meeting with Khrushchev grew out of Szilard's efforts after 1959 to open relations with the Soviet leader. In September of that year Szilard sent Khrushchev an advance copy of "How to live with the bomb," and then in the summer of 1960 he began urging the Soviet premier to support informal meetings of Soviets and Americans—mostly scientists—to discuss world security issues. In one letter to Khrushchev, Szilard included his telephone and room numbers at Memorial Hospital and invited the premier to call on him during an impending visit to New York City that fall for the United Nations session. "I have given some thought to the problem of what it would take to avoid war between America and Russia," Szilard wrote, "and that perhaps it might interest you to hear what I might be able to say on the subject."

On 5 October, at Khrushchev's invitation, Szilard briefly left the hospital and met with him for two hours. Judging from Szilard's notes, it was a friendly session. Szilard, ever playful, gave Khrushchev a Schick injector razor, showed him how to change blades and promised to supply more blades, he said, "as long as there is no war." Khrushchev replied that no one would have time to shave if war broke out. On the Kennedy-Nixon Presidential campaign, Szilard mischievously chided Khrushchev, saying he was distressed that the Soviet premier had emphasized only his disagreements with the candidates.

They briefly discussed Szilard's idea that prominent American citizens would put together a manuscript on the arms race, send the draft to Khrushchev, get his comments and then publish it in what they hoped would be "a lively and interesting book." More importantly, they also talked about Szilard's concept of regional international police forces, as well as ways of solving the Berlin conflict, hopes for

ongoing private Soviet-American discussions and a plan for a Soviet-American hot line. The meeting with Khrushchev inspired Szilard and nourished his hopes for Soviet-American cooperation.

A market for wisdom

As 1961 started and Kennedy entered the White House, Szilard moved to Washington, hoping, as he puckishly phrased it, that he could "find a market for [his] wisdom." He settled with his wife into two hotel rooms at the Dupont Plaza, which he quickly cluttered with papers and files. He took to spending hours in the hotel lobby. "I can work happily in the lobby," he said. "I have never owned a house, and don't feel the need of owning one." In the lobby, he would write, read his mail, meet reporters and friends, and make phone calls.

But his influence with the Kennedy Administration proved minimal. Despite his early hopes for it, Szilard found himself sharply criticizing the Administration's ventures, especially the abortive Bay of Pigs invasion and the short-lived campaign to build bomb shelters, which, he wrote Kennedy, could be interpreted as girding for a US first-strike policy.

Building on his own earlier ideas, Szilard offered elaborate, detailed strategies on how to move to a less dangerous world. He called for intermediate stages of force reduction with varying totals for different weapons—planes, fixed-based ICBMs, submarine-

based missiles and land-based mobile missiles. At a time when many of his usual political allies opposed nuclear testing, Szilard argued that some testing—especially to develop mobile missiles, which could be virtually invulnerable—might reduce public fear and increase the likelihood of an arms control agreement. At a time when the US had about a 4:1 superiority in ICBMs, he warned that a continuing American build-up would sour any chances for an arms control agreement.

He continued to propose ways to prevent nuclear war. He cited the dangers of antimissile defenses and suggested that such systems could lead to a spiraling increase in offensive weapons systems. He recommended, as others had earlier, an effort to establish a "minimum deterrence"—specifically, allowing enough invulnerably based weapons on each side to destroy some of the other nation's major cities, thereby barring either side from initiating an all-out nuclear war without also committing predictable suicide. Such a scenario, he suggested, might require only about 12 Soviet missiles to devastate key American cities and possibly 40 US weapons to destroy a comparable number of Soviet cities.

Szilard argued that it was prudent to insist on an agreement calling for verifiable inspections. He believed the Soviets would probably accept inspections as a condition to halt the arms race and ensure security, as well as to save money that otherwise might go for weapons. Szilard's support for mini-

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Battling cancer, Szilard, photographed here with his wife, Gertrud, a physician, continued to dictate memos, letters, manifestos and sometimes orders to his doctors.



Eugene Rabinowitch, a Met Lab colleague of Szilard's and later a professor of biochemistry at the University of Illinois, shared Szilard's fears for the future and helped found the *Bulletin of the Atomic Scientists*.

that he did not believe that any meaningful agreement was imminent. Instead, he suggested, the US should take some modest unilateral steps: declare a no-first-use policy, agree to use the bomb only if nuclear war erupted, move toward minimum deterrence and certainly refrain from developing counterforce superiority.

These ideas, as he knew, were not original. Even so, he evoked enthusiasm because he offered alternatives to despair, inaction and, possibly, war.

He also proposed the creation of a council, directed largely by scientists, to guide citizens to donate about 2% of their income to designated Congressional candidates. Implicit in his concept was his belief in scientific elitism. Szilard hoped that this peace lobby (originally called the Council for Abolishing War) would liberate the best impulses of the Kennedy Administration. In the next few years, the Council for a Livable World helped elect such Senate candidates as George McGovern of South Dakota, Joseph Clark of Pennsylvania, Frank Church of Idaho, Wayne Morse of Oregon and Jacob Javits of New York.

Judged against the political radicalism of the later 1960s, the council was moderate. It was rooted in mainstream liberal ideology and the traditional two-party system. Szilard himself was distrustful of the ideas of participatory democracy, of an assault on established leadership and authority, and of plans for transforming America. In this connection, he was offended by the Southern black sit-in movement and the sympathetic Northern white picketing and boycott movement. Unlike the emerging "new left," he believed in authority, hierarchy and the wisdom of the intelligentsia, especially if this group contained scientists. He respected property and rejected radical and leftist theories about concentrated power, class-based society and a military-industrial complex.

Even so, his ideas seemed politically daring in 1961. They were unacceptable to the Kennedy-Johnson-Humphrey wing of the Democratic Party. One Navy official told American intelligence people that the council was "subversive and Communist inspired." In 1961, many liberal academics, including most scientists, feared the taint of associating with the council and with Szilard's program. Thus, at Harvard in November 1961, when Szilard spoke, a prominent biologist, soon to win a Nobel Prize, avoided taking part lest, as he explained to a friend, it jeopardize his chance of becoming science adviser to a future President.

After the 1961 Harvard meeting, Szilard, tired and irritable from his

mal deterrence did not mean he was abandoning his quest for arms control, as was the case for many others, but rather was intended as an early step along the long road to disarmament.

Looking around for ways to establish arms control and ultimately to end the nuclear arms race, Szilard frequently returned to one of his old ideas, first offered in 1930, for a *Bund*—that is, small groups of specialized intellectuals who could function as "think tanks." To make this happen, he negotiated with the Ford Foundation in fall 1961 to establish a National Society of Fellows, drawn partly from the Administration, to influence and educate high government officials. In this venture, he sought backing from, among others, Henry Kissinger, then a Harvard government professor best known for his support of limited nuclear war, and Joseph Rauh, a leader in Americans for Democratic Action and a former New Dealer. The Ford Foundation turned down Szilard's proposal and the venture died.

During this same period Szilard was trying to solve the Berlin crisis. After the Soviets erected the Berlin wall in August 1961 and Kennedy called up reserve forces, Szilard offered his services to the White House for private diplomacy. He wanted "to hop a plane and fly to Moscow" to offer Khrushchev a package proposal that East Germany would move its capital from East Berlin and that West Berlin would become a

free city. "I had a rather good conversation with him [Khrushchev] about this point in October" of 1960, Szilard said. The Kennedy Administration was not interested in such a scheme.

Such rebuffs did not lessen Szilard's enthusiasm for new ventures. In the autumn and winter of 1961, beginning at the Harvard Law School Forum on 17 November, Szilard visited eight campuses, where he gave a speech ("Are we on the road to war?") that led to the formation of the Council for a Livable World. For some who heard him then, his words were an inspiring call for action.

At Harvard, Szilard began his lecture in a prankish way: "I am here under false pretenses, and since I am about to be found out, I might as well confess at once, and throw myself upon your mercy. I am not here to deliver the kind of lecture which you may expect from me. I came here in order to invite those of you who are adventurous to participate in an experiment that might show I am all wrong. And, it might well be that something of a more serious nature is at issue also."

He then declared that the chances were "slim" of getting through the next two years without war. He argued that "the problems which the bomb poses to the world cannot be solved except by abolishing war." Stressing that arms control efforts had failed so far, he asserted that the Soviets were interested "in far-reaching disarmament," but

lecture, had no desire to relate personally with the young people who had helped him. He had little understanding that they might want to hear a few kind words. Szilard was distant. Students had enlisted in his crusade, he believed, because of the merits of his analysis, not because of the charisma of his personality, and so his personal attention was irrelevant and unnecessary. Yet when they asked questions about politics or nuclear strategy, he was willing to spend time explaining, parrying, listening—at all times responding sympathetically to the younger people as near-equals.

By 1962, while still promoting the council, Szilard was also trying, once again, to set up a Soviet-American project for informal meetings. This "angels project," as he playfully called it, would bring together US government consultants and junior officials with their Soviet counterparts. The Americans, he explained, should be on the side of the angels and "would be willing to give up, if necessary, certain temporary advantages... for the sake of ending the arms race." Between August 1962 and June 1963, a period punctuated most notably by his panicky flight to Geneva during the Cuban missile crisis in October 1962, he maneuvered to arrange such a meeting. But the opposition of William C. Foster, head of Kennedy's recently established Arms Control and Disarmament Agency, helped scuttle the venture. At the outset, Foster barred agency members and advisers from taking part, and then the Soviets backed out in August 1963.

Hope and despair

For Szilard, his last year in Washington was a mixture of hope and despair—the collapse of the angels project, the failure of some similar ventures, the growth of the council, his periodic bursts of enthusiasm for arms control, his descents into occasional despondency during and after the Cuban missile crisis and his anxiety that the Kennedy and Johnson Administrations would deepen their commitment to the Vietnam War. "Starting with the Cuban missile crisis, last October," he wrote in 1963 to an older friend who was abandoning the US to live in Geneva, "I have been getting more and more convinced that the country will come to grief. If I were to stay in Washington until the bombs begin to fall and were to perish... I would consider myself, on my deathbed, not a hero but a fool."

In February 1964, briefly pessimistic, he said, "I myself shall make no further attempts to engage the Russians in 'private discussions' on the subject of



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Atoms for Peace Award was presented to Szilard and another Hungarian-born physicist, Eugene Wigner (left background), at a White House ceremony in 1960 by President Eisenhower's science adviser, James R. Killian Jr.

arms control." He felt betrayed by the liberal Kennedy-Johnson Administration and defeated by the euphoria that followed the limited test ban treaty of 1963. In February 1964 he moved to La Jolla, California, hoping to continue his work in biophysics, on aging and memory, and to inspire other scientists at the recently formed Salk Institute, where he had become a permanent fellow. At the same time he continued advising the council and looking for ways to control the bomb and move toward disarmament.

His wife as well as some old friends thought he was achieving a level of contentment in La Jolla that he had never known before. Some sensed a general softening in Szilard in his final years. "You are warmer [since your hospitalization] and more human than you ever were before," Polanyi told him. But the promise of comfortable years in La Jolla, with productive work at the Salk Institute, ended abruptly on 30 May 1964, two months after Szilard's 66th birthday, when he died of a heart attack in his sleep.

Acknowledging that Szilard might have finally found an inner peace in those last months, Teller wrote in a eulogy, "I cannot help but think of that legendary, restless figure, Dr. Faust, who in Goethe's tragedy dies at the very moment when at last he declares he is content."

To the end of his life, Szilard continued his crusade for peace. Always

exuberant about the power of rationality, he brought to his efforts a fierce energy and a fertile imagination. Having done all he could to create the atomic bomb and all he could within the law to prevent its use on populations in 1945, he spent his last 19 years courageously seeking arms control, disarmament and world peace.

In helping to shape the postwar dialogue in this quest, Szilard made some difference. His thinking about nuclear strategy was, admittedly, not as influential as that of, say, Bernard Brodie and Thomas Schelling, perhaps partly because Szilard did not operate near the corridors of power. Still, his actual efforts to change international politics—conceiving and participating in various Soviet-American informal discussions, frequently writing and speaking to an elite public, organizing a "peace" lobby and meeting with Khrushchev—may have contributed slightly to a thaw in the cold war.

Szilard, like those in SANE or connected with the *Bulletin of the Atomic Scientists*, groups with whom he shared much intellectually, could not successfully oppose the larger forces of the cold war. Nor, like those groups, was he able to analyze those forces deeply. He never rooted his concern about peace and the bomb in a probing analysis of national culture, history, economic factors and ideologies. Even had he done so, however, he no doubt would have failed to change policy significantly.

April 22, 1957

Memorandum on "How to Live With the Bomb"

The present policy on the bomb

That a war in which America and Russia are lined up on opposite sides might lead to an all-out atomic catastrophe is well understood today, and few people believe that ~~either America or Russia~~ ^{of them} will deliberately precipitate such a war. Moreover in the present circumstances, it is likely that both America and Russia will become more and more reluctant to take the kind of calculated risks which might lead to war -- risks of the sort that they did not hesitate to take in the past. Such an attitude may well postpone an all-out war, but it is not likely to prevent it. ~~in our present basic strategy~~ ^{We may take it for granted that} concerning the use of the bomb in the foreseeable contingency, ~~that~~ ^{offer us no opportunity to make any decision} ~~quite in the contrary, an all-out war is inevitable.~~

In the absence of a political settlement between Russia and America, it is ~~very~~ likely that perturbances will continue, and that one of these perturbances will lead to military action and to military intervention on America's part and Russia's part on opposite sides. In such a contingency, according to the prevailing strategy, America would try to limit the fighting to the local area and fight the war there with atomic bombs. It is my contention that there is an inherent instability in this strategy, and that an atomic war fought initially as a local war is likely to trigger all-out atomic destruction. Let us ~~the sake of argument~~ ^{the sake of argument} imagine, for instance, that Russia should move troops into Iran and that we are committed to defend Iran, and let us make the optimistic assumption that we shall refrain from bombing any of the Russian bases

First draft of Szilard's manuscript on "How to live with the bomb" shows the author's scribbled emendations. The essay, considered quintessential Szilard for its curious amalgam of the prescient and the pessimistic, was eventually published in the *Bulletin of the Atomic Scientists* in 1960. (Courtesy of Mandeville Collection, University of California, San Diego.)

He kept faith with himself and his values. More than most other striking figures in science, he continued to think and act on an untrammelled conception of the moral responsibility of scientists. In the pursuit of peace and the effort to change national policy, he remained an outsider. Unlike J. Robert Oppenheimer or Teller, who served the government in the postwar years and became such bitter foes and symbols for such different positions, Szilard never excited hatred or rancor, nor was he intolerant. He did not seek positions on Federal advisory committees, for he valued the freewheeling ways that distance and independence could help guarantee. Strong-willed, quarrelsome and often unpredictable, Szilard would not have been a controllable adviser, and therefore he was not sought.

Yet, ironically, throughout his life Szilard believed ardently in the power of advice, in the need for wise men (especially scientists) to influence the government. Ultimately, in moving to create the Council for a Livable World, he shifted to emphasize electoral poli-

tics—but initially to gain a greater hearing for the wisdom he believed that he and his associates could offer. For him, electoral politics was not a substitute but a supplement to change policy by gaining access to government officeholders. They might listen, he believed, because the council could deliver votes.

Beyond the seemingly possible

Szilard's political ventures could sometimes miscarry and even offend possible domestic allies. In the mid-1950s, for instance, when he proposed that scholars band together to call for the resignation of Secretary of State John Foster Dulles, Szilard met quick rebuffs. And when he privately proposed a bipartisan Eisenhower-Stevenson ticket for 1956, he was told, correctly, that he did not understand US politics.

Perhaps it was this very misunderstanding of the American political system that inspired him to organize scientists to try to block the use of the atomic bomb against Japan and then to organize them to thwart formal mili-

tary control of postwar atomic energy. Such spirited imagination and political energy also led him to propose, unsuccessfully, settlements of the Quemoy-Matsu crisis in the mid-1950s and of the Berlin crisis in the early 1960s. Because he never worried about developing safe ideas or muting his moral obligations, he felt free to protest against many events that other scientists of his generation might privately decry or simply ignore.

Szilard acknowledged the need to reach beyond the boundaries of the seemingly possible. "Let your acts be directed towards a worthy goal," he once said, "but do not ask if they will reach it; they are to be models and examples, not means to an end."

Even political allies, like Eugene Rabinowitch, a biochemist who served as editor of the *Bulletin of the Atomic Scientists*, were sometimes inclined to chide Szilard for his boldness. "It is too easy to say," wrote Rabinowitch, "that some of his proposals are unrealistic or too cleverly contrived; but nobody can deny that they are ingenious, original and stimulating."

Szilard's sense of conscience, his intellectual boldness, his willingness to try new ideas, to unsettle conventions and to disregard old ways could be inspiring. He liked to be intellectually disruptive and original. He was willing to devise ideas, drop them and try others.

He was a man of moral vision who took on himself the great burdens of improving Soviet-American relations and of trying to save the human race from extinction in a nuclear holocaust. As Arthur Holly Compton, Szilard's World War II boss in the Manhattan Project, told him in 1960, "History will see you . . . as one who labored bravely to make of [our] age a condition of life under which men could enjoy an increasing degree of safety and mutual confidence, in spite of the threats of war." Szilard was a kind of moral hero who knew that total success could not be achieved, yet failure would mean disaster.

Perhaps the best brief testimonial to Szilard's creative brilliance and moral commitment was expressed by Brandeis University in October 1961, as it bestowed on him the degree of Doctor of Humane Letters: "Among the first to perceive the threat and the promise of nuclear energy . . . crusading indefatigably to help men understand how to live with themselves, and with their creations, in the atomic age. A prophet ahead of his time yet passionately part of it, a victim of its maladies, but demonstrating through his own courage, that they, too, may be conquered." □