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Fermi's Children

The Global Responsibilities of Italian Scientists after the Nuclear Bomb

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Abstract: This essay examines the role of Italian scientists in shaping the concept of global responsibility during the Cold War, focusing on Edoardo Amaldi and Adriano Buzzati-Traverso. Global responsibility emerged in response to the development and use of atomic bombs, which forced humanity to evaluate actions in terms of their consequences for all people across space and time. It was later extended to environmental risks and even drawn on in the context of overpopulation. Being rooted in the rationalist and internationalist ethos of science, many scientists felt a special obligation regarding both for their role in developing nuclear weapons and in warning the public regarding the dangerous capacity of these weapons. They organized themselves through Pugwash and other transnational networks, which have also taken root in Italy. While Amaldi, who was the leader of postwar Italian science and a disciple of Enrico Fermi, mobilized scientific networks for peace and disarmament, Buzzati regularly informed the wider public about global threats. The Italian case highlights the contested meanings of global responsibility in the nuclear age.

Keywords: Amaldi, Edoardo; Buzzati-Traverso, Adriano; global responsibility; Pugwash; science and activism; anti-scientism; environmentalism; overpopulation; anti-nuclear movement; nuclear dissemination.

Introduction

The contemporary world is shaped by a political tension between global interdependence and nationalism. Whereas historians such as Akira Iriye interpret the rise of global and transnational consciousness as an inevitable outcome of the decline of the nation-state and the expansion of interdependence,[1] others, such as Roger Eatwell and Matthew Goodwin,[2] point to the resurgence of nationalist and traditionalist movements, which openly challenge globalization and liberalism under the banner "my country first." Since 1945, the international movement against nuclear armaments and proliferation has been one of the most significant drivers of internationalism. This essay reconstructs the movement's development and its key protagonists in order to assess its contribution

[1] Akira Iriye, "The Making of a Transnational World," in *Global Interdependence: The World after 1945*, ed. Akira Iriye, Cambridge, MA: Belknap Press 2014, pp. 679-847, here p. 695.

[2] Roger Eatwell and Matthew Goodwin, *National Populism: The Revolt Against Liberal Democracy*, London, UK: Pelican Books, 2018.

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to the rise of transnational consciousness.

I build on Mats Andrén's thesis that the concept of global responsibility was initially created by the advent of nuclear weapons, with their unprecedented potential for human extinction.[3] Rather than inventing global consciousness, the environmental movement adopted and adapted an already existing conceptual framework. At its core, the notion of global responsibility posited the unity of humankind, insisting that, in the nuclear age, human actions must be judged by their consequences for all people on the planet, rather than merely for individual nations or interest groups. The atomic bomb thus expanded the horizons of expectation to encompass the entirety of humanity, including future generations, and called for solidarity unconstrained by spatial or temporal limitations.

This essay focuses in particular on the role of activist scientists in shaping the idea of global responsibility. This concept did not emerge fully formed but was instead collectively built through transnational exchanges among intellectuals and politicians from various nations and backgrounds. They were among the first scientists to grasp the emerging paradigm shift and to articulate distinct conceptual responses to it. Alongside philosophers, theologians, literary intellectuals, and social scientists, natural scientists played a crucial role in formulating responses to the nuclear threat.

The mobilization of scientists against nuclear weapons has been extensively studied. Lawrence Wittner gave due recognition to their role in the early stages of the disarmament movement in his classic history of the subject.[4] Scholarship has continued to examine this theme, thereby giving particular attention to the political nature of expertise itself. Paul Rubinson has shown how the United States government deployed expertise to marginalize dissident scientists, compelling them to devise new strategies of mobilization.[5] Toshihiro Higuchi has analyzed the continuities between nuclear and environmental concerns, as well as the role of epistemic community of scientists in defining risk.[6] Recent histories of the Pugwash movement, emblematic of scientific activism against nuclear weapons, have underscored its significance while also reassessing its triumphalist narrative, particularly the balance between national and transnational interests.[7]

By contrast, the Italian contribution to the movement against nuclear weapons has received little attention in English-language scholarship, with the notable exception of an important article by Lodovica Clavarino.[8] My essay examines the contributions of Italian scientists to the development and diffusion of the concept of global responsibility during the Cold War, focusing on two key figures: physicist Edoardo Amaldi and biologist Adriano Buzzati-Traverso.

Italy's position regarding nuclear disarmament was distinctive. Geopolitically marginal, without nuclear weapons of its own, it was more likely a potential target than an initiator of nuclear conflict. Yet Italian physics research had been central to the discovery of nuclear fission through the work of Enrico Fermi, first in Rome in the 1930s and later as a leading figure of the Manhattan Project in the United States. Amaldi, the only one of Fermi's disciples to remain in Italy, played a pivotal role in rebuilding physics and scientific research in postwar Italy. Amaldi and other Italian scientists thus occupied a particular position: they could reflect on both on the political and scientific marginality of a defeated nation and on their direct responsibility for having contributed to the development of nuclear weapons.

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[3] Mats Andrén, "Atomic War or World Peace Order? Karl Jaspers, Denis de Rougemont, Bertrand Russell," *Global Intellectual History* 7/4 (2022), 784–800. [Henceforth cited as *AWW*]

[4] Lawrence S. Wittner, *One World or None: A History of the World Nuclear Disarmament Movement through 1953*, Stanford, CA: Stanford University Press, 1993. [Henceforth cited as *OWN*]

[5] Paul Rubinson, *Redefining Science: Scientists, the National Security State, and Nuclear Weapons in Cold War America*, Amherst, MA: University of Massachusetts Press, 2016.

[6] Toshihiro Higuchi, *Political Fallout: Nuclear Weapons Testing and the Making of a Global Environmental Crisis*, Stanford, CA: Stanford University Press, 2020.

[7] Alison Kraft, Holger Nehring, and Carola Sachse, "The Pugwash Conferences and the Global Cold War: Scientists, Transnational Networks, and the Complexity of Nuclear Histories," *Journal of Cold War Studies* 20/1 (Winter 2018), 4–30.

[8] Lodovica Clavarino, "Italian Physicists and the Bomb: Edoardo Amaldi's Network for Arms Control and Peace during the Cold War," *Journal of Contemporary History* 56/3 (July 2021), 665–692. [Henceforth cited as *IP*]

The Special Responsibility of Scientists

In the era of global responsibility, scientists bear a distinct form of responsibility. They had ushered in the Atomic Age and possessed exclusive knowledge that allowed them to warn of its consequences. At the same time, science was also framed as a potential source of salvation, as it is a transnational enterprise with an ethos seemingly well-suited to advancing peace and democracy. As scientific research came to include increasingly public funding, legitimacy in the eyes of the public became essential, and scientists were compelled to counteract their association with atomic destruction. This shift in sentiment may also have its origin also in the fact that the building of nuclear weapons was no longer a secret. For example, Jon Agar describes how President Dwight Eisenhower initiated a "different diplomatic tack" that led to the Atoms for Peace movement and subsequent additional social movements.[9]

Physicists were the first to confront the dangers of the atomic bomb, for only they possessed the expertise to comprehend its implications, even before such weapons existed. This was exemplified by Leo Szilard, who, in the 1930s, foresaw the destructive potential of the nuclear chain reaction and, in 1939, urged physicists to keep nuclear research secret to avoid giving the German scientists an advantage (*OWN* 5-11). That same year, Szilard persuaded Albert Einstein to write to President Franklin Roosevelt about the danger of a German-built atomic bomb, prompting United States involvement in nuclear research and eventually the Manhattan Project. Szilard, who was born into a Hungarian Jewish family and emigrated to London during World War II, was committed to defeating the German advances into nuclear physics, which initially led him to support military research; however, after Germany's surrender, his position shifted. He organized a petition with other Manhattan Project scientists urging that the bomb ought not be used against Japanese cities. The petition declared that the use of atomic weapons would inaugurate a new wave of universal responsibility. From this petition, Wittner quotes the following:

> "a nation which sets the precedent" of using atomic bombs "may have to bear the responsibility of opening the door to an era of devastation on an unimaginable scale." [*OWN* 30]

Many Manhattan Project scientists later adopted pacifist or anti-nuclear weapons positions. As Andrén points out, already early on Niels Bohr, Einstein, and Robert Oppenheimer warned of the dangers of the bomb and advocated international control (*AWW* 784). This implied a special responsibility for the scientists involved. Oppenheimer writes:

> the physicists felt a peculiarly intimate responsibility for suggesting, for supporting, and in the end, in large measure, for achieving, the realization of atomic weapons.[10]

Wittner has shown that scientists such as Szilard, Joseph Rotblat, and Eugene Rabinowitch were at the forefront of efforts to warn against the bomb and to promote a system of international governance to safeguard humanity from national selfishness. Their alliance with world federalists produced the slogan "One world or none," which was taken up by intellectuals across different nations as a shared expression of global cooperation. An exemplary statement of this ethos was a 1950 advertisement by a British organization called The Crusade for World Government that was signed by, among others, Einstein, Albert Camus, Jacques Maritain, and Thomas Mann. Wittner quotes this passage as follows:

> Confronted by the means of destruction that are now in the hands of men...all differences of politics, race and creed are beside the point. These things will virtually cease to exist along with the human race unless mankind agrees to the establishment by peaceful means of a world government...The choice is indeed between one world or none. [*OWN* 161, 381]

The movement failed to influence policymakers with the onset of the Cold War, which brought the abandonment of plans for international control of nuclear weapons and a rapid build-up of nuclear arsenals by both the United States and the Soviet Union. Opposition to nuclear weapons was further weakened by the parallel existence of the World Peace Council, led by the communist physicist Frédéric Joliot-Curie. Although it formally pursued similar goals, the Council was controlled by communists

[9] Jon Agar, *Science in the Twentieth Century and Beyond*, Cambridge UK, Polity Press 2012, pp. 326–9, 404–10.

[10] J. Robert Oppenheimer, "Physics in the Contemporary World," *Bulletin of the Atomic Scientists* 4/3 (1948), 65-68, 85-86, here p. 66.

and focused its criticism exclusively on United States weapons.

A new wave of opposition emerged after 1954.[11] While the end of the Korean War and the death of Stalin created possibilities for *détente*, the Eisenhower administration's nuclear strategy of "massive retaliation" and the development of the hydrogen bomb by both superpowers heightened the urgency of the nuclear threat. The Castle Bravo incident of March 1, 1954—in which the Japanese fishing vessel Lucky Dragon 5 was caught in the fallout of a thermonuclear test at the Bikini Atoll—became a symbol of the dangers posed by nuclear weapons.

Bertrand Russell assumed a leading role in this renewed mobilization, advocating world government and warning that the survival of humanity required a radical transformation of its mentality (*AWW* 790-2). In 1955, Russell drafted an appeal for leading scientists to sign, which became known as the Russell-Einstein Manifesto after its most prominent signatories. Presented in London on July 9, 1955, the manifesto declared that its signatories spoke not in the name of certain nations but on behalf of the entire human species. Scientific authority was invoked to affirm the gravity of the situation and the need to transcend ideological and national boundaries. The manifesto included dire words of caution:

> We have found that the men who know most are the most gloomy.[12]

One of the manifesto's immediate consequences was a call for an international meeting of scientists. After lengthy preparations, the first conference took place in the Canadian village of Pugwash on July 7, 1957, bringing scientists from the West, China, and the Soviet Union. The third Pugwash conference, held in Austria in September 1958, was the first to acquire a public dimension and concluded with the Vienna Declaration, which articulated the movement's basic principles. The declaration of the sixty-nine renowned participants at the conference emphasizes the dual responsibility of scientists: responsibility arising from their expertise and responsibility to continue practicing international cooperation in science research:

> The ability of scientists all over the world to understand one another, and to work together, is an excellent instrument for bridging the gap between nations and for uniting them around common aims. We believe that working together in every field where international cooperation proves possible makes an important contribution toward establishing an appreciation of the community of nations... We hope scientists everywhere will recognize their responsibility, to mankind and to their own nations, to contribute thought, time, and energy to the furthering of international cooperation.[13]

> Scientists are, because of their special knowledge, well equipped for early awareness of the danger and the promise arising from scientific discoveries. Hence, they have a special competence and a special responsibility in relation to the most pressing problems of our times. [*VD* 344]

During the late 1960s and 1970s, Pugwash began to lose its exclusive focus on nuclear disarmament, expanding its mission to encompass issues such as overpopulation and environmental destruction. This shift illustrates the continuity of global responsibility between nuclear disarmament and environmental protection, while also reflecting the greater optimism of *détente*. In 1975, the Helsinki Accords recognized the inviolability of postwar frontiers in Europe and committed European and North American states to peaceful conflict resolution and cooperation. The Strategic Arms Limitations Talks (SALT) marked the first serious attempts at arms control since 1945.

The threat of nuclear annihilation returned to prominence in the late 1970s with the onset of the so-called "Second Cold War." The organizers of the 30th Pugwash Conference, held in the Netherlands in August 1980, issued a statement that includes the following forewarning:

> Never before has mankind been in such grave peril. A major nuclear war would mean the end of civilization and could lead to the extinction of the human race... In these circumstances our duty as human beings and scientists is clear—we must opt for survival.[14]

Pugwash aligned with other peace organizations and the mass peace movement that mobilized

[11] Lodovica Clavarino, *Scienza e politica nell'era nucleare: La scelta pacifista di Edoardo Amaldi*, Roma, IT: Carocci editore 2014, pp. 108–22. [Henceforth cited as *SPN*]

[12] https://pugwash.org/1955/07/09/statement-manifesto/.

[13] "Vienna Declaration," *Bulletin of the Atomic Scientists* 14/9 (November 1958), 341-344, here p. 342. [Henceforth quoted as *VD*]

[14] The Netherlands Pugwash Group, "Pugwash 1980," *Bulletin of the Atomic Scientists* 36/9 (November 1980), 9.

across Europe to fight against the deployment of intermediate-range ballistic missiles in Western Europe (Euromissiles) following the collapse of negotiations with the Soviet Union over reciprocal disarmament. In the second half of the 1980s, Pugwash welcomed General Secretary Mikhail Gorbachev's initiatives for peace.

Pugwash was one of the most significant movements of politically engaged scientists, consistently advocating for peace and disarmament throughout the Cold War, and was ultimately recognized with the Nobel Peace Prize in 1995. Some scientists, such as Amaldi, fully embraced the model of scientific activism embodied by the movement: the ideal of science as an international enterprise inspired by rationality and ethics in the service of all humanity. Yet, others, such as Buzzati-Traverso, grew increasingly disillusioned with this form of activism.

Italian Pugwashites: A Profile of Italian Scientists against Nuclear Weapons

Both Amaldi and Buzzati-Traverso were central nodes in the network of Italian scientists committed to peace and nuclear disarmament. Clavarino reports that although Amaldi was the only Italian physicist invited to the first Pugwash conference in 1957, he attended for the first time in September 1958 in Austria (*IP* 675). He supported Pugwash from its inception and served on the Continuing Committee between 1962 and 1972. Buzzati-Traverso was the founding president of the Italian Pugwash chapter, established in 1966 (*SPN* 136). Both played important roles in communicating the dangers of nuclear weapons to the Italian public from the 1960s through the 1980s.

Amaldi began his research career as part of the Via Panisperna group led by Enrico Fermi, one of the most advanced physics teams in the world in the early 1930s. By the end of the decade, the group had disbanded as members fled into exile to escape political and racial persecution or disappeared under mysterious circumstances. Amaldi remained at the University of Rome, La Sapienza, providing continuity for physics research during the war years. In the postwar era, he assumed responsibility for the task of rebuilding Italian research. He held the chair of Physics at the university for four decades and served on numerous scientific committees. Amaldi enjoyed wide international recognition and played a decisive role in the establishment of the European Organization for Nuclear Research (CERN)—serving as secretary-general during its formative years from 1952 to 1954—as well as in the creation of the European Space Agency (ESA).

Buzzati-Traverso laid the foundations of genetics research in postwar Italy.[15] Having kept a low profile during the fascist era due to his junior status, he emerged in the postwar period as a prominent intellectual of the non-communist left-wing culture. He became the foremost opponent of Lysenkoism in the 1940s and 1950s.[16] In the 1960s, he was an internationally recognized leader in genetics, serving as head of the International Laboratory of Genetics and Biophysics in Naples. His scientific career was abruptly cut short in 1968, when radical students and researchers occupied his laboratory and destroyed all research samples. He subsequently became the deputy director of UNESCO and an advisor to the United Nation Environmental Programme, established after the 1972 Stockholm Conference on the Human Environment. Buzzati also contributed regularly as science columnist for *L'Espresso*, *Corriere della Sera*, and *La Stampa*. In 1982, he published *Morte nucleare in Italia*, a book detailing the effects of nuclear weapons on Italian cities.

The profiles of Amaldi and Buzzati-Traverso display striking similarities. Both commanded authority thanks to their international reputation and central roles within the Italian scientific system. Both engaged regularly with public opinion. Both had accepted political quietism under fascism and war but became increasingly engaged during reconstruction. Both were non-communist secular progressives, a political space underrepresented in parliament yet influential among intellectuals who sought to remain independent of both the Italian Communist Party and Christian Democracy. In their public engagement, they advocated *détente* and promoted a vision of Italian society aligned with Western and Nordic models of modernization. Their trajectory will show their differences.

[15] Francesco Cassata, *L'Italia intelligente: Adriano Buzzati-Traverso e il laboratorio internazionale di genetica e biofisica, 1962-69*, Roma, IT: Donzelli, 2013.

[16] Francesco Cassata, *Le due scienze: Il caso Lysenko in Italia*, Torino, IT: Bollati Boringhieri 2008, p. 106.

Edoardo Amaldi: The Scientist as Organizer

The question of scientific responsibility tormented Amaldi throughout his life. Having directly contributed to the experiments that paved the way for the nuclear bomb, he approached the matter concretely:

> Science cannot be either responsible or irresponsible. It is individuals who take on responsibilities, not science in an abstract sense.[17]

Amaldi shared Russell's conviction that scientific progress demanded new ways of thinking. When asked whether science created more problems than it solved, he answered:

> This is baloney. The problems were created by humanity, not science. Of course, if someone gets wrong ideas into their head and thinks that science should solve certain things, they will be disappointed: but at this point, it is they who have not understood what the role of science is.
>
> The truth is that humanity has never faced certain developmental problems because they did not exist in the past. It is therefore evident that it is up to humans to solve them through different behavior and education. Only a fool can "demonize" science, attributing certain responsibilities to it.
>
> The new problems actually stem from the alarming proliferation of the human species and the lack of discernment with which the goods produced by new knowledge are used. [*ISM* 166]

As Clavarino has shown, the question of responsibility regarding the atomic bomb weighed on Amaldi for decades (*SPN* 79-81). According to both his son Ugo and Carlo Rubbia, a Nobel laureate in Physics,[18] Amaldi's sense of responsibility and public engagement stemmed from the responsibilities he and other scientists had played in nuclear research.[19] Although the German government never sought his assistance for its nuclear program, he was particularly troubled by the hypothetical question of what he would have done had he had managed to emigrate to the USA in 1939, like his friends of the Via Panisperna group, and had been asked to join the Manhattan Project. He concluded:

> After long and repeated consideration of this purely hypothetical case, I arrived to the conclusion, that after a few changes of mind and a lot of suffering, I would have accepted, as a duty, an extreme unpleasant duty, not towards my country of origin or this or that group of people, but towards that part of Humanity that in spite of all its unpleasant qualities, still represent the best in real existence.[20]

In this conception, responsibility toward humanity as a whole, irrespective of national origins, could serve to justify the development of the atomic bomb. This reveals that Amaldi was not a strict pacifist but rather that responsibility toward humanity could assume different and even conflicting forms—as Friedrich Dürrenmatt suggested in *Die Physiker*. Amaldi framed the issue in terms of responsibility, asking whether a scientist would have been culpable for enabling a German victory by refusing to help the Allies develop the bomb first. This line of reasoning was prevalent among many physicists who later embraced pacifism, including Szilard, Rotblat, and Bohr.

On the question of conscience, Amaldi argued that the decision to pursue a line of research was ultimately an individual responsibility. In principle, he maintained that scientists should avoid destructive research (*ISM* 56). Yet, he conceded that in moments of emergency, these scruples might be set aside. No scientist of the Manhattan Project, he observed, had wished to build nuclear weapons; they participated out of fear of Germany's weapons program. His own commitment to disarmament was partly driven by the fear that such extraordinary circumstances might one day recur:

> We should, however, be prepared to the idea that if in the future these same people [scientists signing peace petitions] will find themselves in a climate of continuously and rapidly increasing terror, earlier or later, some of them, or perhaps many of them, will feel justified or even morally obliged to drastically change

[17] Edoardo Amaldi, *Intervista sulla materia dal nucleo alle galassie*, ed. Piero Angela, Roma-Bari: IT, Laterza 1980, p. 132. [All translations are mine. Henceforth cited as *ISM*]

[18] Edoardo Amaldi, *Da via Panisperna all'America: I fisici italiani e la seconda guerra mondiale*, eds. Giovanni Battimelli and Michelangelo De Maria, Roma, IT: Editori riuniti 1997, p. 12.

[19] Carlo Rubbia, "Edoardo Amaldi, Scientific Statesman," *CERN* 91/09, Geneva, CH: CERN 1991, 1-40, here p. 18. [Henceforth cited as *EA*]

[20] Edoardo Amaldi, "Comments after the Weart Talk" attached to S.R. Weart, "The Road to Los Alamos," *Le Journal de Physique Colloques* 43/C8 (Supplément 12, December 1982), C8-301–C8-321, here p. C8-321. [Henceforth cited as *EAC*]

> their mind. Let us hope that situations similar to that met by mankind during the early 40's will not be faced again. [*EAC* C8-321]

Amaldi attended the third Pugwash conference in Austria in September 1958 and was one of the signatories of the Vienna declaration, which emphasized the dual responsibility of scientists as experts and as internationalists (*SPN* 125). Addressing the Accademia Nazionale dei Lincei—the Italian academy of science and arts—in 1962, he made the optimistic prediction that scientific progress was the defining feature of twentieth-century humanity and that past successes in solving problems provided evidence that new challenges would likewise be solved.[21] He acknowledged the dangers of science, above all the possibility of mass destruction through nuclear weapons. Yet he also linked global responsibility to other existential risks, warning of overpopulation, pollution, radioactive fallout from atomic tests, and, with notable foresight, the greenhouse effect. While these problems arose from scientific civilization, Amaldi argued that it was human nature—not science—that was to blame if solutions were not applied. Nonetheless, he expressed hope that humanity would soon acquire the wisdom to address them.

At this stage, Pugwash concentrated primarily on promoting a ban on nuclear testing and halting nuclear proliferation. Its first tangible achievement was the signing of the Limited Test Ban Treaty by the United States, the Soviet Union, and the United Kingdom in August 1963. In 1964, Amaldi circulated an appeal among Italian professors in favor of disarmament, stressing the special responsibility of scientists to make the public aware of the destructive potential of nuclear weapons (*SPN* 144). The first Pugwash conference in Italy, held in 1965, led to the creation of an Italian Pugwash chapter, which in turn founded the International School on Disarmament and Research on Conflicts (ISODARCO). Amaldi and the physicist Carlo Schaerf had been working on the project since 1962. Their aim was to demonstrate that scientists could contribute to political questions such as international security, disarmament, and arms control, by providing specialized expertise to decision-makers.[22] ISODARCO organized biennial courses that saw the participation of scientists and policymakers from Western, Communist, and neutral countries as teachers.

Amaldi also strongly supported the Treaty on the Non-Proliferation of Nuclear Weapon (NPT), which entered into force in 1970 with the backing of the United States, the Soviet Union, and the United Kingdom. The treaty committed non-nuclear states not to develop nuclear weapons. Further, it obliged nuclear powers neither to assist other states in acquiring military technology nor to withhold support for civilian nuclear energy. Italy was a reluctant signatory: Christian Democratic politicians and diplomats feared that the treaty would enshrine Italian inferiority vis-à-vis nuclear powers (*SPN* 150). The government sought to condition ratification to greater disarmament by the nuclear states. Italian scientists, by contrast, unequivocally supported the NPT. As early as 1967, Amaldi and Francesco Calogero, another prominent Italian Pugwashite, publicly endorsed the treaty. In an interview with the newspaper *La Stampa*, Amaldi warned that the proliferation risked creating a chain reaction: states would seek nuclear weapons out of fear of their neighbors, compelling those neighbors, in turn, to develop them.[23] Such dynamics, he argued, would multiply the chances of escalation and accident, rendering nuclear war inevitable. For him, a national deterrent could not guarantee security; only renouncing nuclear weapons could provide non-nuclear states with the moral authority to press for global disarmament. Opponents of the treaty delayed ratification. In 1974, 142 physicists signed an appeal to ratify the treaty (*SPN* 159). The Italian parliament ratified the NPT in May 1975.

From the late 1970s until his death in 1989, Amaldi was deeply engaged in efforts toward *détente* and nuclear disarmament. He consistently

[21] Edoardo Amaldi, "La cultura scientifica nella società moderna," in *Ricerca scientifica e sviluppo economico, Vol. 2*, eds. Comitato Nazionale dell'Energia Nucleare et al., L'organizzazione, la spesa e il finanziamento della ricerca, Roma, IT: Comitato Nazionale Energia Nucleare 1963, pp. 1-18.

[22] Carlo Schaerf, "ISODARCO, Scuola internazionale sul Disarmo e la ricerca sui conflitti," in *Fisica per la pace: Tra scienza e impegno civile*, ed. Pietro Greco, Roma, IT: Carocci editore 2017, pp. 175-94, here p. 177.

[23] Alberto Ronchey, "L'ultima occasione per il mondo di fermare la catastrofe nucleare," *La Stampa*, 24 February 1967, p.1. https://archive.org/details/lastampa_1967-02-24/.

signed petitions of Italian and European physicists, convinced that scientists had a duty to lend their names to such appeals (*SPN* 168). In 1981, he endorsed an appeal addressed to the President of the Italian Republic, Sandro Pertini, warning of the dangers posed by the Euromissiles and growing international tension. The petition gathered more than 800 signatures from Italian physicists, and in November, Amaldi personally led the delegation that presented it to Pertini (*IP* 682-3). It underscored physicists' obligation to alert the public to nuclear dangers. Out of this initiative emerged the Union of Scientists for Disarmament (Unione degli scienziati per il disarmo, USPID), founded in 1983 and modelled on organizations such as the Union of Concerned Scientists and the Committee for a SANE Nuclear Policy (*SPN* 170-1, IP 684).[24]

Amaldi and his network regularly addressed the public through *Sapere*, a popular science magazine edited by fellow activist physicist Carlo Bernardini. The September 1984 issue featured articles explaining various weapons systems. Amaldi's own contribution provided a didactic account of nuclear physics, the history of nuclear research, the Manhattan Project, and scientists' engagement in peace activism.[25] While his personal views are difficult to ascertain, the article highlighted the ethical commitment of pacifist scientists to the welfare of humankind as a whole. In May 1986, he returned to Niels Bohr's proposal for "an open world."[26] Bohr had argued that nuclear weapons had created a new reality in which the measures designed to strengthen national security became obstacles to collective security. Military secrecy fostered distrust and heightened the risk of conflict; the only solution was an open world with free exchange of military and scientific information. For Amaldi, European research institutions such as CERN, EURATOM, ESA, and Eureka exemplified this ideal of openness.

In 1988, after becoming president of the Accademia dei Lincei, Amaldi established the Working Group for International Security and Arms Control (Sicurezza internazionale e il controllo degli armamenti, SICA), inspired by the CISAC of the American Academy of Science. Testimonies from colleagues confirm that Amaldi played a decisive role in the creation of both USPID and SICA and that he believed Italian scientists bore a social responsibility to study international problems and propose solutions to the public and governments (*USP* 144).

Amaldi's activities demonstrate his strong and enduring commitment to advancing nuclear disarmament and peace through Italian and international institutions. This was his most significant contribution, as for decades he was the leading figure in shaping science policy and organizing scientific institutions in Italy. As Clavarino has emphasized, Amaldi's role extended beyond lending his personal authority to the cause of peace: he mobilized a network of committed and expert scientists who could act across institutions and in diverse capacities to advance his cause (*IP* 668). In doing so, Amaldi gave concrete expression to the idea of global responsibility, translating it from an abstract principle into sustained institutional practice.

Adriano Buzzati-Traverso: The Scientist as Publicist

At the turn of the 1950s and 1960s, Buzzati-Traverso was asked by his readers about the responsibility of scientists in the nuclear era.[27] He regarded their role as crucial, but articulated a complex and sometimes ambivalent perspective.[28] On the one hand, he reaffirmed the neutrality of technology: basic research was driven by curiosity, and scientists could not be held accountable for how their discoveries were ultimately used. At the same time, he reminded his audience—both readers and television viewers—that since World War II, scientists have stepped out of the ivory tower (*SPN* 136).[29] They have felt responsible for the invention, handling, and use of the atomic bomb since Szilàrd's 1945 appeal, and this sense of responsibility has shaped their continued engagement

[24] Carlo Bernardini, Giuliano Colombetti, Diego Latella, Francesco Lenci, "L'USPID," in *Fisica per la pace: Tra scienza e impegno civile*, ed. Pietro Greco, Roma, IT: Carocci editore 2017, pp. 143-54. [Henceforth cited as *USP*]

[25] Edoardo Amaldi, "Nuclei scienziati e militari," *Sapere* 50/8-9 (September 1984), 6–27.

[26] Edoardo Amaldi, "Il ruolo dell'Europa," *Sapere* 52/5 (May 1986), 5–14.

[27] Adriano Buzzati-Traverso, "Lo scienziato neutrale," *L'Espresso* 5/31 (2 August 1959), 8.

[28] Adriano Buzzati-Traverso, "Il pericoloso divorzio tra scienza e politica," *L'Espresso* 9/41 (13 October 1963), 12. [Henceforth cited as *IPD*]

[29] Adriano Buzzati-Traverso, "I pacifisti atomici del Pugwash," L'Espresso 10/6 (9 February 1964), 10.

with this topic. For Buzzati-Traverso, the primary duty of scientists is to provide reliable information that enables ordinary citizens and decision-makers to navigate scientific questions.

Yet, he also advanced a broader ambition: the scientific method, which had proven so effective in understanding nature, could likewise be applied to human affairs. Scientists, he argued, were capable of offering a superior moral framework to that provided by theologians, and, further, politics was too serious to be left to politicians. To achieve this, scientists had to organize collectively, for instance, through groups such as Pugwash, to coordinate their actions and ensure their voices were heard.

At the same time, Buzzati-Traverso insisted on another dimension of responsibility: scientists should refuse to participate in the development and deployment of the hydrogen bomb, whose use would and could only be destructive. To prevent future cases like those of Galileo or Oppenheimer, he proposed a Hippocratic oath for scientists—a pledge to "do no harm."[30] This left Buzzati-Traverso in an inherently ambiguous position as the question arose whether scientists primarily were responsible by virtue of their expertise, or whether their responsibility consisted instead in preventing the misuse of their discoveries, and all of this while maintaining the principle of scientific neutrality.

Buzzati-Traverso situated these questions within a broader historical trajectory. Since the birth of science, rationality had steadily expanded humanity's control over nature, yet a corresponding application of rationality to social organization had lagged behind (*IPD* 12).[31] The immense power unleashed by scientific progress—including the possibility of human extinction—created unprecedented freedom, yet such freedom demands a commensurate sense of responsibility. For this reason, Buzzati-Traverso envisions a new ethical system grounded in scientific values such as honesty, detachment, tolerance, and freedom.[32] Since ordinary citizens and policymakers lack the means to grasp the complexities of specialized knowledge, he concluded that scientists bear a crucial responsibility in guiding collective decision-making.

Buzzati-Traverso was among the first to inform the broader public about Pugwash and other initiatives aimed at nuclear disarmament. He felt a pressing need to act, convinced that both public opinion and political elites were too slow to grasp the threat of nuclear annihilation.[33] In his view, scientists must stand at the forefront of the struggle for peace, uniquely positioned to mobilize public opinion and offer practical solutions to governments. Compelled to step outside their laboratories, they have to advocate for "a rational use of the fruits of reason."[34] Buzzati-Traverso argued that Pugwash had successfully developed ideas later adopted by politicians, such as employing seismographs to monitor nuclear tests and pursuing gradual disarmament. Because science is inherently international, he maintained, scientists are particularly suited to fostering understanding across national divides—for example, between American and Soviet scientists or between Israeli and Egyptian counterparts.[35]

His opposition to nuclear weapons was driven both by international tensions and by the dangers of nuclear fallout. As a biologist, he was particularly concerned about the long-term effects of radiation. He emphasized that nuclear tests disregarded borders, contaminating even those in non-nuclear countries—just as French tests in the Sahara had affected Italians (*LSR* 10) or Soviet tests had harmed "Indians and Hottentots alike."[36] Buzzati-Traverso welcomed early steps toward nuclear détente, including the 1963 Partial Test Ban Treaty and the negotiations that led to the NPT. Like Amaldi, he endorsed the treaty, arguing that the global consequences of nuclear war had rendered the concept of national sovereignty obsolete.[37] World government, he concluded, was no longer a utopia but a necessity.

[30] Adriano Buzzati-Traverso, "La morte chimica minaccia il mondo," *L'Espresso* (27 December 1959), 14.

[31] Adriano Buzzati-Traverso, "La scienza proibita," *L'Espresso* 8/19 (13 May 1962), 14.

[32] Adriano Buzzati-Traverso, "La lunga notte di Nagasaki," *L'Espresso* 8/50 (16 December 1962), 14.

[33] Adriano Buzzati-Traverso, "Lo scirocco radioattivo," *L'Espresso* 5/36 (6 September 1959), 10. [Henceforth cited as *LSR*]

[34] Adriano Buzzati-Traverso, "Scienziati ribelli contro potenti sordi," *L'Espresso* 8/42 (21 October 1962), 10.

[35] Adriano Buzzati-Traverso, "Gli scienziati federati aggrediscono la guerra," *L'Espresso* 11/17 (25 April 1965), 14.

[36] Adriano Buzzati-Traverso, "Trasformano il mondo in un lazzareto," *L'Espresso* 7/40 (1 October 1961), 10

[37] Adriano Buzzati-Traverso, "Armi di domani," *Corriere della Sera* 93/190 (21 August 1968), 11.

In the early 1960s, Buzzati-Traverso openly criticized thinkers and politicians who attacked science and technological modernity. The harmful consequences of technology, he argued, did not stem from scientific curiosity but from the irrational motives of industrialists and politicians—hatred and greed—that had driven both nuclear armament and environmental destruction. He introduced his readers to Rachel Carson's work, while lamenting that society took technological marvels for granted and consequently undervalued the benefits of science.[38] Comparing radiation-related deaths to the lives saved by medical technologies dependent on radiation, he insists that the latter far outweigh the former. He further argues that fear of nuclear war should not inhibit the peaceful use of nuclear energy, which could ultimately help prevent conflicts. In 1964, he stressed the need to balance the precautionary principle with the demands of scientific and economic progress.[39]

By 1968, Buzzati-Traverso had become increasingly receptive to critiques of science and industrial modernity, particularly those voiced by the student movement.[40] Traditionally, scientists had maintained that research was driven by curiosity and that it was impossible to predict which discoveries would prove useful, meaning that science itself could not be regulated—only its applications. Buzzati-Traverso, however, citing Amitai Etzioni approvingly, acknowledged that since industrialization, humanity had been forced to adapt to new technologies, yet this adaptation had failed. Citizens of developed nations, he argued, suffered from urban malaise, alienation, and the looming threat of nuclear annihilation. A few years later, he went further, claiming that human evolution had equipped the species for a hunter-gatherer existence. However, agriculture and industrialization were too recent in biological terms for genuine adaptation.[41] Science had conquered infectious diseases, yet modern populations were now succumbing to the so-called diseases of civilization, such as heart disease, cancer, and arteriosclerosis.

When a reader objected to his 1968 article by insisting that responsibility lay with politicians rather than scientists, Buzzati-Traverso displayed skepticism toward a position he himself had once upheld.[42] He judged Pugwash's achievements—the Partial Test Ban Treaty and the NPT—as being meager. He had recognized that scientists had lost legitimacy in the eyes of the public and admitted that young people were right to question reason itself. Yet a few years later, he argued that science was not beyond redemption: its subordination to politics had been a recent phenomenon, and scientists still possessed the capacity to resist harmful developments.[43] The dilemma's solution, in his view, was not to reject the Enlightenment but to construct a new one instead.

Like other Pugwashites, by the late 1960s Buzzati-Traverso shifted his focus to other existential threats to humanity, thereby raising questions of global responsibility. Chief among these was overpopulation, which he repeatedly described as "the biological bomb."[44] This Malthusian concern aligned him with the emerging environmental consciousness. In 1973, he wrote extensively about the limits to growth and the dangers of pollution, warning that both capitalist and socialist societies, through their industries and technological expansion, were destroying the environment, poisoning the air, and driving humanity toward war. The existential dilemma, he argued, lay in the conflict between productivity and survival.[45] Elsewhere, he referred to a "race to suicide"[46] and declared, "Here is how we kill ourselves,"[47] listing his concerns regarding desertification, famine, and

[38] Adriano Buzzati-Traverso, "Il radiologo vince la furia atomica," *L'Espresso* 10/7 (16 February 1964), 10.

[39] Adriano Buzzati-Traverso, "Siamo aggrediti da nemici invisibili," *L'Espresso* 10/11 (15 March 1964), 10.

[40] Adriano Buzzati-Traverso, "Si può bloccare il progresso scientifico?," *Corriere della Sera* 93/220 (25 September 1968), 11.

[41] Adriano Buzzati-Traverso, "Settanta e non di più," *L'Espresso Colore* 34 (26 August 1973), 16-17.

[42] Adriano Buzzati-Traverso, "La bomba biologica," *Corriere della Sera* 93/238 (16 October 1968), 11.

[43] Adriano Buzzati-Traverso, "Scienza e politica," *Corriere della Sera* 96/109 (12 May 1971), 17.

[44] Adriano Buzzati-Traverso, "Malthus ha ragione duecento anni dopo," *L'Espresso* 12/17 (24 April 1966), 14.

[45] Adriano Buzzati-Traverso, "La terra è una camera a gas," *L'Espresso* 19/2 (14 January 1973), 24.

[46] Adriano Buzzati-Traverso, "Quanto può durare la corsa al suicidio," *L'Espresso Colore* 12 (25 March 1973), 31-33.

[47] Adriano Buzzati-Traverso, "Ecco come ci uccidiamo," *L'Espresso Colore* 37 (16 September 1973), 17-18.

climate change as existential threats. By this stage, he had even grown skeptical of civilian nuclear power, citing the insoluble problem of nuclear waste.[48]

This shift—from nuclear weapons to environmental catastrophe—reflected Buzzati-Traverso's evolving understanding of global consequences and the need for global responsibility. Based on this, he called for self-sacrifice and an end to national selfishness. Commenting on the 1972 United Nations Conference on the Human Environment in Stockholm, he argued that humanity required a new form of patriotism. He writes:

> Only if we can replace current nationalisms with a single planetary nationalism will man still have some hope of surviving.[49]

Buzzati-Traverso did not abandon scientific rationality, but he conceded that the simplistic Baconian equation of mastering nature followed by inevitable human progress had lost credibility.[50] He participated in a broader transnational debate about the limits and purposes of science. In this context, Jenny Andersson argues that the idea of a manageable future and teleological progress served to discredit alternatives to existing policies.[51] Contestation of the status quo thus took the form of a challenge to the scientific rationalism underpinning high modernism. Instead of celebrating large-scale engineering projects, Buzzati-Traverso, aligning himself with the latest social movements, argued that true rationality lay in developing so-called soft technologies that encouraged a return to nature rather than its transformation and that prioritized human individuality instead of suppressing it. This was done in the spirit of embracing the slogan, small is beautiful.[52]

With the resurgence of international tensions during the "Second Cold War," nuclear annihilation once again became a central concern for Buzzati-Traverso. In his book, *Morte nucleare in Italia*, he reiterated the importance of scientists' special responsibility. As a biologist who had studied the effects of radiation on living organisms, he considered himself both qualified and obliged to warn of the risks of nuclear war.[53] Assisted by physicist Schaerf—previously mentioned as one of Amaldi's collaborators—the book draws on computer-generated projections and scenarios, lending authority to its apocalyptic forecasts.

Buzzati-Traverso assigned a special role to scientists more broadly. Since 1945, a minority had sought to inform the public about the horrors of nuclear weapons, only to be obstructed by obtuse politicians and generals. By the 1980s, however, he observed that things had been taken too far and "a sort of rebellion" by scientists was emerging worldwide (*MN* 130). He particularly praised the corresponding efforts undertaken by the Union of Concerned Scientists and the International Physicians for the Prevention of Nuclear War. While he valued Pugwash, he criticized it as being elitist and insufficiently connected to the broader public (*MN* 160-1). For Buzzati-Traverso, the urgency of the nuclear threat required scientists to educate public opinion, even at the expense of their career progression.

Unlike Amaldi, Buzzati-Traverso placed responsibility for accelerating the arms race on science itself. The pace of research, he argued, generated fears of technological inferiority, and these fears were taken to justify ever greater investments in military technology (*MN* 157-8). Given the substantial number of scientists directly involved in military research, claims of scientific neutrality and pure research appear untenable. Buzzati-Traverso condemned the willingness of scientists to collaborate uncritically with the military (*MN* 162-3), insisting that they need a stronger sense of social responsibility and greater awareness of the consequences of their work:

> It is a significant dilemma whether a scientist's loyalty should be primarily to the human species or to his own country. However, the dilemma goes beyond the scientist's responsibility, as what is at stake are the

[48] Adriano Buzzati-Traverso, "Il mestiere di sopravvivere," *L'Espresso Colore* 14 (8 April 1973), 33-35.

[49] Adriano Buzzati-Traverso, "È un patriota ama tanto il suo pianeta," *L'Espresso* (18 June 1972).

[50] Adriano Buzzati-Traverso, "Il progresso in un annuario," *L'Espresso Colore* (15 July 1973).

[51] Jenny Andersson, *The Future of the World: Futurology, Futurists, and the Struggle for the Post Cold-War Imagination*, Oxford, UK: Oxford University Press 2018, pp. 215–7.

[52] Adriano Buzzati-Traverso, "Una vita di ricambio," *L'Espresso Colore* 18 (6 May 1973), 31-33.

[53] Adriano Buzzati-Traverso, *Morte nucleare in Italia*, Roma-Bari, IT: Laterza 1982, p. vii. [All translations are mine. Henceforth cited as *MN*]

> possible, acceptable limits of human actions. If it was recognized during the Nuremberg trials or similar occasions that citizens should refuse to obey when the orders received are against human conscience, there should be equally valid reasons for a scientist to refuse to cooperate with industry or government authorities when the objectives of the work assigned to him clearly conflict with the interests of humanity. [*MN* 163]

Scientists, Buzzati-Traverso argued, might be accused of betraying their nation,

> but it is precisely on this point that the merit of the scientist's position is measured, for their refusal to cooperate with military initiatives amounts to a vigorous push in favor of international governance and against the maintenance of national sovereignties. [*MN* 164]

In *Morte nuclear in Italia*, he stressed how nuclear weapons undermined national frontiers. Even if Italy itself were not directly targeted, winds could carry fallout from explosions in neighboring countries to Italian soil (*MN* 58-9). Radiation also has long-term effects, causing illness and death decades after detonation, and is affecting future generations. The impact is therefore not only spatially global but also chronologically deep (*MN* 61-3). Nuclear war, he warned, would engulf all humanity and the entire planet. Civilization would vanish, leaving the survivors to descend into isolation, barbarism, and ultimately extinction. He cautions thus:

> Due to mankind's warlike madness, culture, civilizations, humanity itself, and all other animal species will risk disappearing. [*MN* 76]

Buzzati-Traverso quotes Francesco Calogero—a physicist close to Amaldi—who is criticizing NATO's deterrence strategy. Calogero argues that although mutually assured destruction had preserved peace between the blocs, deterrence required nuclear weapons to be ready for use quickly and easily, making escalation both plausible and dangerous (*MN* 79-80). He compares this logic to that of parents removing the guardrails from a balcony to make their children more cautious when skating. Buzzati-Traverso further denounced Italy's position within NATO, noting that it hosted the second-largest number of nuclear bases within NATO and thus sacrificed sovereignty while making nearby areas priority targets (*MN* 101-8).

The book's aim was to convey the danger of nuclear war to Italian readers. It catalogued military and civilian targets, listed the cities likely to be targeted, and estimated the number of victims and probabilities of survival (*MN* 85-99). Italians were invited to find their own city and calculate their odds of surviving. Buzzati-Traverso paints an unrelentingly pessimistic picture:

> Although no vital national interest can justify a nuclear war, a realistic assessment of the facts leads us to conclude that it would be a true miracle if we reached the end of our century without a nuclear exchange occurring. [*MN* 109]

He acknowledged that deterrence had thus far prevented war, as second-strike capabilities enabled overwhelming retaliation. Yet the arms race had produced both immense destructive stockpiles and increasingly precise delivery systems. Under such conditions, the superpowers might be tempted to launch preventive strikes to disarm the enemy, thereby destabilizing deterrence itself. NATO's strategy of flexible response merely reinforced this illusion, suggesting that a limited nuclear war with tactical weapons was possible. In reality, Buzzati-Traverso argues that such strategies turned Europe into a battlefield (*MN* 114-21). Nuclear war would not be war in any meaningful sense apart from the destruction of governments, humanity, and civilization, whilst not yielding any political gains.

Although a Cold Warrior in the 1940s, Buzzati-Traverso had become critical of NATO by the 1980s. He contended that European states should expel US weapons and troops to avoid serving as the theatre for the US-Soviet nuclear conflict (*MN* 125). At the same time, he insisted that European countries should strengthen their conventional forces to deter Soviet attack while abandoning nuclear deterrence, which only ensured that Europe remained a target. For Buzzati, nuclear weapons rendered traditional conceptions of security obsolete, demanding a new framework that weakened rather than strengthened the nation-state (*MN* 128). Only bold initiatives, he argued, could break the spiral toward nuclear war, as negotiations were leading nowhere. One possible step would be a unilateral decision by a European country to reject nuclear weapons on its soil, thereby creating a cascade effect, pushing other European countries to follow the example (*MN* 142).

Buzzati-Traverso drew inspiration from the Rapacki Plan of 1957, which proposed the establishment of a nuclear-free zone in Central

Europe by removing nuclear weapons from states along the Iron Curtain. Adam Rapacki justified his proposal by insisting that

> The conditions are thus ripe for statesmen to exercise realism and common sense—because today the true interests of humanity are more universal than ever before.[54]

Buzzati-Traverso also cited the ideas of Egon Bahr, a German social democrat close to former Chancellor Willy Brandt, and the Independent Commission on Disarmament and Security, chaired by former Swedish prime minister Olof Palme, who had made Sweden a leading voice of non-alignment in the Cold War. The Swedish reference was particularly significant: Buzzati envisioned armed neutrality, rejection of nuclear weapons, and withdrawal from dangerous entanglements in alliances—although he still supported NATO's continued existence—implicitly presenting Sweden as a model not only for individual nations but for the European continent as a whole.

Buzzati-Traverso proposed that Italy should take the first step by demanding the withdrawal of all NATO nuclear weapons and relying exclusively on conventional forces (*MN* 149). In his broader conception of humanity, however, culture and "the millennia-old heritage" occupied a central place (*MN* 150). Italy's specific mission, he suggested, derives from its role as the cradle of European civilization. He even suggested that a nuclear-free Italy could safeguard the world's significant cultural artefacts, preserving them from destruction in their countries of origin, and one day they could be returned to the survivors of nuclear annihilation.

Buzzati-Traverso's vision of human unity was distinctive. Although he recognized the transnational consequences of nuclear war, in *Morte nuclear in Italia* he nevertheless suggested that individual countries might devise strategies to spare themselves from destruction. This ambivalence contrasted with his nearly contemporaneous writings, in which he acknowledged the global risks to humankind, including early hypotheses about nuclear winter.[55] For Buzzati-Traverso, however, the essence of humanity's unity lay less across space than across time. For him, civilization and culture form the link between generations. The actual danger, he argued, is short-term thinking, which ignores both change and the potential for change. Even communism, he observed, had evolved and could continue developing. The binary opposition between communism and capitalism, he insisted, is false, for the only possible choice consists in choosing humankind. Survival depends on ensuring the continuity of humanity into the future:

> If we do not resort to the madness of nuclear war to resolve our petty disagreements with others, our children and grandchildren will have all the time to change the contents of the bottles that today bear a label we do not like: millennia and probably millions of years await humanity. But if we commit the nuclear crime, everything could end tomorrow. [*MN* 152-3]

The trajectories of Amaldi and Buzzati-Traverso exemplify two distinct but complementary interpretations of global responsibility. Amaldi translated the principle into institutional practice: he mobilized networks of scientists, shaped international organizations, and consistently framed responsibility in terms of expertise and the duty of scientists to inform decision-makers and the public. His approach reflected a rationalist optimism that science, if embedded adequately in international institutions, could advance peace and security. Buzzati-Traverso, by contrast, developed a more ambivalent and critical vision. While he, too, believed scientists bore a special duty, he increasingly questioned the neutrality of science, emphasized the ethical and cultural dimensions of responsibility, and warned against the dangers of technological modernity itself. His insistence on the temporal unity of humankind—linking past, present, and future through civilization and culture—stood in tension with his at times national or even parochial solutions. Taken together, Amaldi and Buzzati-Traverso reveal both the possibilities and the contradictions inherent in the attempt to articulate a scientific ethic of global responsibility during the Cold War.

Conclusion

The Italian case was liminal: marginal within the Western world yet still part of its center; a pawn of geopolitics, though not to the same degree as a

[54] Adam Rapacki, "The Polish Plan for a Nuclear-Free Zone Today," *International Affairs* 39/1 (January 1963), 1-12, here p. 12. Also quoted by Buzzati (*MN* 146).

[55] Adriano Buzzati-Traverso, "Una guerra atomica in Europa farebbe 300 milioni di morti," *Corriere della Sera* 107/71 (13 April 1982), 11.

Third World country; integrated into international scientific research, though lacking the resources to compete for primacy. These conditions made Italy an ideal setting for advocating international cooperation in both science and politics.

Amaldi and Buzzati-Traverso devoted decades to the pursuit of peace and disarmament. Buzzati-Traverso regularly intervened in public debates through his writing, while Amaldi, though less publicly visible, consistently supported Italian and international organizations working for nuclear disarmament. Both were simultaneously national figures—prominent scientists and opinion-makers in Italy—and international actors, that is, active participants in institutions operating at a global level. Both embodied the values of rationality, internationalism, and commitment to peace. Their political activism highlighted the distinctive responsibility of scientists: first, accountability for creating technologies that could be misused; second, boundness for possessing the expertise to warn against their dangers; and third, answerability for exemplifying the internationalist character of science itself. In this sense, they shared the model of engagement advanced by other public scientists within the Pugwash movement.

This model, however, faced open challenges. For instance, another member of the Via Panisperna group, Franco Rasetti, pursued a more radical pacifism. Having left Italy in 1939 to escape fascism, he settled in Canada and categorically refused to participate in the Manhattan Project. Rasetti contended his conviction that by developing the bomb, the Allies had descended to the same moral level as the Axis. He openly condemned his former friends, dismissing the postwar humanitarian engagement of the Manhattan Project scientists. In 1946, he declared:

> The worst imbeciles of all are those physicists who, after having worked with all their energy to achieve the most colossal massacre of all time, now shed crocodile tears and whine about the future of humanity. [*SPN* 75]

Rasetti concluded that physicists held no privileged role in the struggle for peace; instead, both they and their discipline were guilty of what had happened. He took this belief to its logical conclusion by abandoning physics altogether and turning to other scientific fields.

Further criticism came from the radical science movement of the late 1960s and 1970s. Natural and social scientists associated with this current, such as the sociologist Hilary Rose and the neuroscientist Steven Rose rejected the neutrality of science, arguing that it had been perverted by capitalism and imperialism.[56] For them, scientists were not special saviors of humanity but rather cogs in the capitalist system of production and complicit with the ruling classes. Many of them argued that scientists should follow the lead of workers and peasants, allowing their science to be transformed from below, as, in their view, it was happening in China during the Cultural Revolution.

Even harsher attacks came from outside the scientific community. The criticism by philosophers, social scientists, and artists depicting scientism as inhumane constitutes a vast field. Let me mention the negative vision of instrumental rationality upheld by the Frankfurt School and Michel Foucault. Populist movements also joined in, challenging scientific expertise in the name of ordinary people or traditional authorities.

The survey of opponents of science helps explain scientists' political engagement for peace and disarmament. The war had represented a huge step forward for science: the state had become willing to finance laboratories and universities on an unprecedented scale, inaugurating the era of what is known as big science. Yet, this circumstance also entailed a close association with military power, which many scientists found distasteful and threatened to undermine the very notion of pure research. The frequency of Amaldi's statements in defense of pure research was, in part, needed to contain the backlash from pacifist constituencies.

In a lengthy 1980 interview, Amaldi directly confronted the arguments of the radical science movement. In it, he reaffirmed the principle of scientific neutrality, rejected claims of capitalist or imperialist influence on science, and praised science's progressive role in advancing human civilization (*ISM* 132-8, 165-71). Yet his advocacy was, in many respects, a rearguard action against the rising tide of technological pessimism. Buzzati-Traverso, by

[56] Hilary Rose and Steven Rose, "The Incorporation of Science," in *The Political Economy of Science: Ideology of/in the Natural Sciences*, eds. Hilary Rose and Steven Rose, London, Macmillan 1976, pp. 14-31.

contrast, was more receptive to critiques of science's non-neutrality and complicity with military research. His intellectual trajectory—from staunch defender of scientism during the Lysenko controversy of the 1940s to a far more somber and skeptical perspective in the 1980s—was striking. Reflecting this growing pessimism about science and rationality, he increasingly resorted to apocalyptic imagery:

> Each scientist serves at least two deities: the god of the ethics of knowledge, who demands that everything be sacrificed to the thirst for understanding; and the other, the god of civic and human ethics. The limit of the ethics of knowledge was invisible a priori, and we have crossed it without knowing it. It is the frontier beyond which knowledge brings with it widespread death: today, the tree of knowledge risks collapsing under the weight of its own fruits, crushing Adam, Eve, and the unfortunate serpent.[57]

The scientists' struggle for peace was therefore multifaceted and partially contradictory: it was at once an altruistic commitment to save humanity, an idealistic defense of research for research's sake, and a self-interested effort to protect the legitimacy of science and scientists as a social group against mounting criticism.

The Italian experience demonstrates how the idea of global responsibility was interpreted, enacted, and contested in the Cold War. Italy's liminal position—marginal within the Western bloc yet integrated into its scientific and political networks—created fertile ground for scientists to advocate international cooperation. Amaldi and Buzzati-Traverso embodied two contrasting yet complementary trajectories. Amaldi translated global responsibility into institutional practice: he worked through international organizations, cultivated networks of scientists, and defended the neutrality of science while stressing the duty of experts to inform decision-makers and the public. By contrast, Buzzati-Traverso superseded early scientism with later skepticism: He came to accept criticisms of science's complicity with military power, embraced apocalyptic rhetoric, and envisioned responsibility not only as transnational but also as transgenerational, linking humanity's survival to the preservation of civilization and culture.

Both figures, however, exemplified a broader model of scientific activism shared by Pugwash and recognized in the 1995 Nobel Peace Prize, namely a commitment to rationality, internationalism, and peace rooted in the conviction that scientists bore special obligations to humanity. Yet this model was never uncontested. Radical scientists rejected the claim of neutrality and saw science as structurally tied to capitalism and imperialism, while philosophers and social critics attacked technological rationality as dehumanizing. Amaldi's technocratic optimism and Buzzati-Traverso's critical pessimism thus reveal both the possibilities and limits of grounding political responsibility in science.

The history of Italian scientists' engagement for peace underscores both the promise and the contradictions of global responsibility. It shows how science could serve as a vehicle for international cooperation and moral authority, but also how it remained entangled with military power, social critique, and political disillusionment. In summary, the efforts of Amaldi, Buzzati-Traverso, and their contemporaries highlight the enduring challenge of the nuclear age: reconciling scientific progress with humanity's survival.

[57] Adriano Buzzati-Traverso, "I pesanti frutti della conoscenza," *Corriere della Sera* 107/21 (26 January 1982), 13.