

Nuclear arms control and disarmament

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Summary

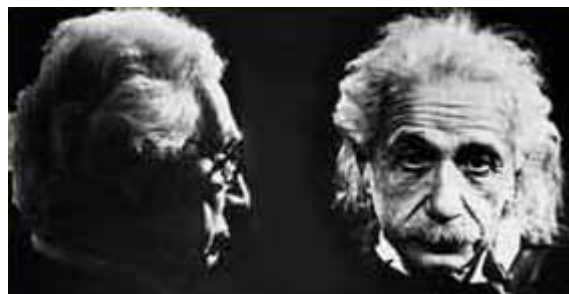
The involvement of Edoardo Amaldi, and of the physics community in Italy, in arms control and disarmament issues is reviewed; and recent developments on the prospects of a transition to a nuclear-weapon-free world are tersely reported.

- **September 5, 1908:** birth of Edoardo Amaldi.
- **1926:** Enrico Fermi becomes the first Professor of Theoretical Physics in Rome.
- **1927:** the students Edoardo Amaldi, Ettore Majorana and Emilio Segré shift from Engineering to Physics (at this University in Rome).
- **1934:** the Rome group (Fermi, Amaldi, D'Agostino, Pontecorvo, Rasetti, Segré) discover the effectiveness of slow neutrons to initiate nuclear reactions.
- **1938:** anti-Jewish laws are promulgated by the Fascist regime in Italy.
- **1938:** Fermi receives the Nobel Prize for Physics and moves with his family to the USA; the Rome group disbands, only Amaldi remains in Rome.
- **June 4, 1944:** liberation of Rome.

- **April 25, 1945:** liberation of Italy.
- **6 August 1945:** Hiroshima.
- **9 August 1945:** Nagasaki.
- **from 1945:** the period of reconstruction, with Amaldi playing the main role in physics (and other fields as well), in Italy and also in Europe.
- **1949:** the Soviet Union explodes a nuclear device, the nuclear arms race is on.
- **1952-:** the "H bomb" is developed (from explosive devices based on fission to those involving fusion; from multi-kiloton warheads to multi-megaton warheads).

The Russell-Einstein Manifesto

Issued in London, 9 July 1955



Bertrand Russell and Albert Einstein

In the tragic situation which confronts humanity, we feel that scientists should assemble in conference to appraise the perils that have arisen as a result of the development of weapons of mass destruction, and to discuss a resolution in the spirit of the appended draft.

We are speaking on this occasion, not as members of

this or that nation, continent, or creed, but as human beings, members of the species Man, whose continued existence is in doubt.

The world is full of conflicts; and, overshadowing all minor conflicts, the titanic struggle between Communism and anti-Communism.

Almost everybody who is politically conscious has strong feelings about one or more of these issues; but we want you, if you can, to set aside such feelings and consider yourselves only as members of a biological species which has had a remarkable history, and whose disappearance none of us can desire.

We shall try to say no single word which should appeal to one group rather than to another. All, equally, are in peril, and, if the peril is understood, there is hope that they may collectively avert it.

We have to learn to think in a new way. We have to learn to ask ourselves, not what steps can be taken to give military victory to whatever group we prefer, for there no longer are such steps; the question we have to ask ourselves is: what steps can be taken to prevent a military contest of which the issue must be disastrous to all parties?

The general public, and even many men in positions of authority, have not realized what would be involved in a war with nuclear bombs. The general public still thinks in terms of the obliteration of cities. It is understood that the new bombs are more powerful than the old, and that, while one A-bomb could obliterate Hiroshima, one H-bomb could obliterate the largest cities, such as London, New York, and Moscow.

No doubt in an H-bomb war great cities would be obliterated. But this is one of the minor disasters that would have to be faced. If everybody in London, New York, and Moscow were exterminated, the world might, in the course of a few centuries, recover from the blow. But we now know, especially since the Bikini test, that nuclear bombs can gradually spread destruction over a very much wider area than had been supposed.

It is stated on very good authority that a bomb can now be manufactured which will be 2,500 times as powerful as that which destroyed Hiroshima. Such a bomb, if exploded near the ground or under water, sends radio-active particles into the upper air. They sink gradually and reach the surface of the earth in the form of a deadly dust or rain. It was this dust which infected the Japanese

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International Conference on "The legacy of Edoardo Amaldi"; Roma, 23.10.2008

fishermen and their catch of fish. No one knows how widely such lethal radio-active particles might be diffused, but the best authorities are unanimous in saying that a war with H-bombs might possibly put an end to the human race. It is feared that if many H-bombs are used there will be universal death, sudden only for a minority, but for the majority a slow torture of disease and disintegration.

Many warnings have been uttered by eminent men of science and by authorities in military strategy. None of them will say that the worst results are certain. What they do say is that these results are possible, and no one can be sure that they will not be realized. We have not yet found that the views of experts on this question depend in any degree upon their politics or prejudices. They depend only, so far as our researches have revealed, upon the extent of the particular expert's knowledge. We have found that the men who know most are the most gloomy.

Here, then, is the problem which we present to you, stark and dreadful and inescapable: Shall we put an end to the human race; or shall mankind renounce war? People will not face this alternative because it is so difficult to abolish war.

The abolition of war will demand distasteful limitations of national sovereignty. But what perhaps impedes understanding of the situation more than anything else is that the term "mankind" feels vague and abstract. People scarcely realize in imagination that the danger is to themselves and their children and their grandchildren, and not only to a dimly apprehended humanity. They can scarcely bring themselves to grasp that they, individually, and those whom they love are in imminent danger of perishing agonizingly. And so they hope that perhaps war may be allowed to continue provided modern weapons are prohibited.

This hope is illusory. Whatever agreements not to use H-bombs had been reached in time of peace, they would no longer be considered binding in time of war, and both sides would set to work to manufacture H-bombs as soon as war broke out, for, if one side manufactured the bombs and the other did not, the side that manufactured them would inevitably be victorious.

Although an agreement to renounce nuclear weapons as part of a general reduction of armaments would not afford an ultimate solution, it would serve certain important purposes. First, any agreement between East and West is to the good in so far as it tends to diminish tension. Second, the abolition of thermo-nuclear weapons, if each side believed that the other had carried it out sincerely, would lessen the fear of a sudden attack in the style of Pearl Harbour, which at present keeps both sides in a state of nervous apprehension. We should, therefore, welcome such an agreement though only as a first step.

Most of us are not neutral in feeling, but, as human beings, we have to remember that, if the issues between East and West are to be decided in any manner that can give any possible satisfaction to anybody, whether Communist or anti-Communist, whether Asian or

European or American, whether White or Black, then these issues must not be decided by war. We should wish this to be understood, both in the East and in the West.

There lies before us, if we choose, continual progress in happiness, knowledge, and wisdom. Shall we, instead, choose death, because we cannot forget our quarrels? We appeal as human beings to human beings: Remember your humanity, and forget the rest. If you can do so, the way lies open to a new Paradise; if you cannot, there lies before you the risk of universal death.

Resolution: We invite this Congress, and through it the scientists of the world and the general public, to subscribe to the following resolution: "In view of the fact that in any future world war nuclear weapons will certainly be employed, and that such weapons threaten the continued existence of mankind, we urge the governments of the world to realize, and to acknowledge publicly, that their purpose cannot be furthered by a world war, and we urge them, consequently, to find peaceful means for the settlement of all matters of dispute between them."

**Max Born, Percy W. Bridgman, Albert Einstein,
Leopold Infeld, Frederic Joliot-Curie,
Herman J. Muller, Linus Pauling, Cecil F. Powell,
Joseph Rotblat, Bertrand Russell, Hideki Yukawa**

- **July 1957**: first meeting in Pugwash (with 22 participants from USA, Canada, USSR, China, Japan, Australia, Europe East and West). Amaldi was invited but could not attend due to other engagements. Soon afterwards he was drafted as a member of the Continuing Committee, the governing body of International Pugwash (now called "Pugwash Conferences on Science and World Affairs").
- **Fall 1962**: the Cuban missile crisis (I happened to be in Washington during that crucial weekend).
- **1965**: annual Pugwash Conference in Venice.
- **Second half of the 1960'**: the risk of proliferation of nuclear weapons, the emergence of the Non Proliferation Treaty (open for signature: July 1st, 1968; entered into force: March 5, 1970).
- Debate in Italy over the NPT, in which Amaldi played a key role.

- **24 February 1967**: front page interview in "La Stampa" (second main newspaper in Italy) by Alberto Ronchey (prominent Italian journalist) with Amaldi and myself arguing in favor of the NPT.
- **5 March 1967**: open letter to the Italian Foreign Minister (Amintore Fanfani) in support of Italy's signature of the NPT, co-signed by almost all the Italian full professors of physics (as I remember, I drafted that letter but did not sign it because we thought it would carry more weight if all the signatories were full professors --- which I was not at the time). [Italy eventually signed the NPT in 1970, and ratified it in 1975, in spite of the strong opposition of the two top officers in the Foreign Affairs Ministry and the chief of the International Department in the Italian "Atomic Energy Commission"].

- **Summer 1966**: first course of what is now called ISODARCO: International School on Disarmament and Research on Conflicts. Patterned on the model of the physics summer schools, it was initiated by Edoardo Amaldi and Carlo Schaerf. It still continues in its educational role, with at least one (winter) course every year, mainly thanks to the dedication of Carlo Schaerf. Next Saturday night Carlo Schaerf, Dick Garwin and myself are flying to China, to attend a Workshop---taking place every second year, now organized by Chinese colleagues as a direct offshoot of ISODARCO, providing a remarkable opportunity for Chinese scientists and technologists --- including those involved in nuclear-weapon activities --- to discuss arms control and disarmament issues among themselves and with foreign colleagues.

- **1972:** Amaldi declines to serve on the Pugwash Continuing Committee in order to cut down on his international travels and to spend more time with his wife (physically---but not mentally---handicapped due to a stroke). I become a member of the Continuing Committee.

- **Second part of the 1970'**: the debate over the deployment by the Soviet Union of the SS-20 intermediate range missiles targeted on Western Europe and the counter-deployment of American land-based cruise and ballistic Pershing missiles in Western Europe.
- **November 27, 1981**: open letter to the President of Italy by the Italian scientific community (signed by over 800 scientists including 150 full professors, mainly physicists, from a broad arc of political and ideological backgrounds), explaining the arguments of both sides and advocating an agreement to prevent this development (*"As Europeans and as Italians, we are especially worried by the current novel start of the nuclear arms race in Europe, with the deployment of the Soviet SS-20 missiles (at the pace of one per week) and with the perspective deployment of new American missiles on the European soil (108 Pershing II and 464 Ground Launched Cruise*

Missiles). Some of us believe the NATO "double track" decision of December 1979 (namely, to begin in 1983 the deployment of the Pershing II and the cruise missiles, and to offer in the meantime to the Soviets to negotiate the limitation and reduction of nuclear weapons in Europe)---a decision that was shared by the Italian government---to be justified as a response to the "modernization" of Soviet intermediate-range missile (the SS-20 missiles are much faster and more accurate than the SS-4 and SS-5 missiles they are supposed to replace; moreover each of them, in contrast to the SS-4 and SS-5 missiles, carries 3 independently-targetable nuclear warheads). Others among us consider that decision wrong: because it was not justified by any real need (there are already thousands of "tactical" nuclear weapons in Western Europe, and moreover some of the American strategic nuclear weapons are already assigned to

NATO); because it stimulates a nuclear arms race in Europe, that will make everybody less secure; because the deployment of nuclear weapons on one's territory (Italy is committed to accept 112 cruise launchers) increases the risk rather than strengthening one's own security. But we are all agreed in hoping that the Soviet-American negotiations scheduled to begin at the end of November in Geneva yield quickly an agreement, that not only put an end to this novel round of nuclear rearmament in Europe, but also initiate a reduction of nuclear weapons. And we all wish that the European States, and in particular Italy, support actively and autonomously such a policy, in every international context and especially in NATO."). Again, the leading role of Amaldi was essential.

- **1987**: the Intermediate Nuclear Forces (INF) Treaty (signed by USA and USSR December 8, 1987; entered into force: June 1st, 1988).

- **1982**: the success of the initiative described above led to the creation of the Italian Union of Scientists for Disarmament (USPID) (somewhat modeled after the Union of Concerned Scientists in the USA; still active).
- **May 29, 1985**: the Scientific Council of USPID issues a detailed statement (22 pages). Let me quote here the opening and closing part of that document:

“The Union of Scientists for Disarmament (Unione scienziati per il Disarmo --- USPID) was created to contribute to spread in Italy a better understanding of the problematique concerning armaments and disarmament; in particular, on the qualitative and quantitative expansion of nuclear weaponry and on the attempts to limit it. Sections of USPID have been created in most Italian Universities. The activity consists in the organization of lectures, seminars,

debates and meetings, and in addition in the preparation and dissemination of informative material via our Bulletin, as well as the translation and publication in Italy of some books, such as the Yearbooks of the Stockholm International Peace Research Institute (SIPRI).

Only exceptionally the scientific council of USPID takes public stands; and in such cases, we try to keep a clear distinction among evaluations based on data, facts and objective informations, on one side, and strategic or political judgements, on the other, in the understanding that on the latter there may well exist a plurality of views among scientists and technologists thinking in good faith.

The Strategic Defense Initiative (SDI) proposed by the President of the United States, and in particular the hypothesis of involving in the research activities associated with it researchers and industries from

outside the United States (in Japan, in Israel, in Australia and in Western Europe, including Italy), have motivated us to intervene on this matter, by issuing this document.

To prepare it, we have consulted several colleagues, including professors Edoardo Amaldi and Bruno Bertotti; but the responsibility of what is written below belongs exclusively to the scientific Council of USPID, whose members are Carlo Bernardini, Francesco Calogero, Paolo Cotta-Ramusino, Michelangelo De Maria, Roberto Fieschi, Francesco Lenci and Carlo Schaerf." ...

... "Finally we would like to bring to the attention of our colleagues --- young researchers, senior scientists, engineers, graduates, technicians --- in addition to the above remarks, some considerations which we believe should be kept in mind by anybody faced by the decision whether to get engaged professionally --- full time, or in

part-time consultative positions --- with projects having a military character. These considerations are motivated by the prospect that Italian researchers get involved in SDI-related projects; and also by the existence in Italy, independently of SDI, of a substantial industrial production of conventional weapons, including sectors of advanced technology (Italy ranks now fifth, or perhaps even fourth, after the USA, USSR, France and the United Kingdom, in the list of weapon-exporting countries. [Comment: this is no more true, weapons exports by Italy having drastically declined over the years]. First of all, it is clear that whoever is thinking about such a choice, should not ignore the implications of his eventual activity; and he should take into account that the weapons of destruction to whose realization his work will contribute might be eventually used

independently of his wishes, on the basis of decisions which he will presumably be quite unable to influence.

Secondly, it is advisable that one acquire detailed information, before embarking on any classified research, about the limitations that this might entail for one's future freedom of action, both in scientific and technological matters, as well as in trying to influence policy decisions.

Finally, to whomever should accept to get involved in militarily-oriented research projects, we appeal to make a conscious effort so as to maintain an autonomous capability to make judgements, without being conditioned by the circumstances in which he will eventually operate."

Note the firmness --- and yet the moderation --- of what we had to say to colleagues who might choose to collaborate with military projects; in particular there was no hint in our approach of any boycott in their regard. Nevertheless our approach, based on reason and dialogue rather than exhortation and excommunication, had, I believe, some impact: there was indeed very little involvement of the Italian scientific community with SDI (of course several elements produced such an outcome; but the lack of enthusiasm of most individuals, motivated by considerations such as those outlined above, did certainly play an important role).

- **October 11-12, 1986:** Presidents Reagan and Gorbachev meet at Reykjavik: "A nuclear war cannot be won and must not be fought". The total elimination of nuclear weaponry is envisaged, but no agreement on major progress in nuclear disarmament is reached due to Reagan's commitment to antiballistic defenses.



Accademia Nazionale dei Lincei

In 1980 the United States [National Academy of Sciences](#) established a [Committee on International Security and Armament Control \(CISAC\)](#) with W.K.H. Panofsky as Chairman. One of its main purposes was to maintain bilateral contacts with an analogous group at the Soviet Academy of Science. In January 1986 CISAC organized in Washington, D.C. a meeting and about ten scientists from European countries participated. In this meeting questions connected to arms control were discussed, together with the possibility of establishing in Europe a group of scientists with a role analogous to that of CISAC. Discussions on international security and armament control were extended beyond the limitation of a direct link between the USA and the USSR.

Francesco Calogero and Carlo Schaerf took part in this meeting and then reported to [Edoardo Amaldi](#) , then Vice President of the Accademia Nazionale dei Lincei. He was very much in favour of this initiative and set up a Working Group on International Security and Arms Control (SICA).

- The first informal meeting was held in Rome at the Academy on 23-25 June 1988, and was entitled [Workshop on International Security and Disarmament: The Role of the Scientific Academies](#). Participants from Belgium, Denmark, France, Federal Republic of Germany, Great Britain, Netherlands, Sweden and USA were present at this meeting. On that occasion it was decided to hold an international conference the following year and to invite participants from other European countries, including the Soviet Union.
- The second meeting was entitled [International Security and Disarmament: the Role of the Scientific Academies](#) and was held in Rome in June 1989.
- The third conference, entitled [International Conference on Security in Europe and the Transition away from Confrontation towards Cooperation](#) was held again in Rome in June 1990. The title, the programme, the specific items had already been established by Edoardo Amaldi (who was President of the Academy at the time) and the SICA group when he died unexpectedly on 5 December 1989. Prof. Giorgio Salvini was elected to succeed him as President of the Academy and of the SICA group as well and it was decided to carry on his work. This meeting was devoted to

problems of peace, environmental cooperation, and measures of effective disarmament in the new international climate. It was at this meeting that the participants decided to dedicate all future meetings to the memory of Edoardo Amaldi and hence the name *Amaldi Conferences*. From then on the Amaldi Conferences continued on a yearly basis.

- IV Amaldi Conference, [Symposium on Science, Technology and International Security](#) hosted by the Royal Society (Cambridge, July 1991)
- V Amaldi Conference, [International security in a transformed world](#) hosted by the Union of German Academies of Sciences and Humanities, in collaboration with the German Research Society and the Max Planck Society (Heidelberg, July 1992)
- VI Amaldi Conference, [A contribution to peace and international security](#) hosted by the Accademia Nazionale dei Lincei (Rome, September 1993)
- VII Amaldi Conference, [Threats to peace and international](#) hosted by the Polish Academy of Sciences (Jablonna, Poland, September 1994)
- VIII Conferenza Amaldi, [Overcoming the obstacles to peace in the post-Cold War era](#)

hosted by the Accademia Nazionale dei Lincei (Piacenza, birthplace of Edoardo Amaldi, October 1995)

- IX Amaldi Conference, [Security questions at the end of the Twentieth Century](#)

hosted by the Accademia Nazionale dei Lincei (Geneva, November 1996)

- X Amaldi Conference, [The path to a secure world](#)

hosted by the Académie des Sciences (Paris, November 1997)

- [XI International Amaldi Conference on Problems of Global Security](#) (the new title of the conferences), hosted by the Russian Academy of Sciences (Moscow, November 1998)

- [XII International Amaldi Conference on Problems of Global Security](#), hosted by the Union of German Academies of Sciences and Humanities (Mainz, October 1999)

- [XIII International Amaldi Conference on Problems of Global Security](#), hosted by the Accademia Nazionale dei Lincei (Rome, Nov./Dec. 2000)

- [XIV International Amaldi Conference on Problems of Global Security](#), hosted by the Accademia Nazionale dei Lincei (Certosa di Pontignano, Siena, April 2002) [[Papers](#)]

- [XV International Amaldi Conference on Problems of Global Security](#), hosted by the Delegation of Finnish Academies of Science and Letters (Helsinki, September 2003) [[Papers](#)]
- [XVI International Amaldi Conference on Problems of Global Security](#), hosted by the International Centre for Theoretical Physics (Trieste, November 2004)
- The more recent Amaldi Conference took place in March 2008 at the laboratory DESY in Hamburg, with Klaus Gottstein as main organizer (see <https://amaldi2008.desy.de>). Consultations are now in progress about when and where to hold the next Amaldi Conference. It is unfortunately not very easy for the European Academies --- given their structure --- to take an active and competent role in these debates.

- Origin and character of the commitment of Amaldi in nuclear arms control and disarmament.

Some of us collaborated with Amaldi over the years on these matters, but there was a difference in the quality and commitment of Amaldi. Firstly because of his much superior eminence, as senior scientific statesman in Italy and indeed in Europe. But also because -- with respect to nuclear weaponry --- he felt a special responsibility, due to his past involvement in key scientific findings that opened the way to mankind becoming able to unleash --- for good and bad --- nuclear energy, and also, more specifically, because although he was never involved in nuclear-weapon research and development, he felt this was due more to chance than to choice. In his own words (written in 1997; my translation from Italian):

“Also for the Italian scientists who remained in Italy during the war and who therefore did not take part in the realization of nuclear weapons, the days when the first two nuclear bombs were dropped on the Japanese cities Hiroshima and Nagasaki were days of profound consternation. It was terrible to find out that an activity undertaken with strictly scientific motivations and in view of eventual, exclusively beneficial, applications could lead to means of destruction of such entity. The problem has been debated over and over by individuals who found themselves variously involved. The war conditions dominating the world scene from September 1, 1939, pressed scientists, whose character was extremely pacific, to engage into the military applications of nuclear energy. It was then universally given as a certainty (and it was indeed true) that the enemy was engaged in such a development and that it could use it

to acquire world dominance. At the beginning it was not easy, indeed it was impossible, to ascertain whether for a physicist a heavier responsibility was to accept or to refuse such a collaboration. Could a physicist in the USA refuse to collaborate, knowing that the Nazis could have conquered the world using this weapon? I was not faced by this dilemma, but I think now that, if I had been faced by this choice, after profound and deeply felt considerations about what my moral duty was when called upon to defend the democracies --- then understood in a wide sense --- or instead close myself within my private sphere doing nothing to fight against the dictatorship, then in the end I would have chosen the first option."

- **1988**: I discuss with Amaldi whether or not I should accept and become Secretary General of Pugwash. I then serve---formally from the beginning of 1989, *de facto* from the middle of 1988, until the middle of 1997. Amaldi, as vice-president and then president of the Accademia dei Lincei, is instrumental in arranging that a Pugwash Office in Rome be hosted by the academy (in a rented locale) and presumably also in the award by the Accademia dei Lincei of the Feltrinelli Prize to Pugwash.
- **December 5, 1989**: Amaldi dies in Rome (at the Accademia dei Lincei).
- **1989**: fall of the Berlin wall, end of the Cold War.

- **Friday, 17 October 1995:** *"The Norwegian Nobel Committee awards the Nobel Peace Prize for 1995, in two equal parts, to **Joseph Rotblat** and to the **Pugwash Conferences on Science and World Affairs**, for their efforts to diminish the part played by nuclear arms in international politics and in the longer run to eliminate such arms."*

In a small party at the Accademia dei Lincei just before going to Oslo to accept the prize on behalf of Pugwash, I expressed my deep regret that the persons who had mostly influenced my ethical education --- my parents, and **Edoardo Amaldi** --- are no more alive to share in this achievement.

- **October 2007.** The more recent Annual Pugwash Conference takes place in Bari. [The main local organizer was our colleague **Beppe Nardulli**, who died this summer at age 60; we held a meeting in Bari a month ago to commemorate him]. In a plenary session (**22 October 2007**) dedicated to the 50th Anniversary of the first meeting in Pugwash (1957) I was asked to talk for 20 minutes on "50 years of Pugwash". Allow me to quote the last part of that intervention of mine:

"... One thing is clear: the strength -- but also the fragility -- of Pugwash depend crucially on the human element: on that trust, shared among most of those involved in the Pugwash enterprise, recognizing that each of us is working for a good cause -- indeed, for a multiplicity of good causes -- together with other individuals motivated by the same overall commitment. So, in the end, it is a matter of individuals.

And let me end on this note: individuals, personalities. The Pugwash enterprise over the last 50 years -- and I submit in the future -- has been and is likely to be useful for humankind inasmuch as it involves committed, and often quite special, individuals. The list of such characters, who played and play an important role in Pugwash -- from all over the world -- is long enough that I could have spent my 20 minutes just reciting their names. Let me finish this presentation by just singling out two such names, not at random, but because of their significance, to

Pugwash, to me and to this circumstance when we meet in Italy. Both these individuals were born in 1908, so next year it is the centennial of their birth, that shall surely be adequately celebrated, because both of them have been eminent, indeed quite eminent, both in connection with Pugwash and more generally.

*The first of them is of course **Joseph Rotblat**, who has devoted most of his long life to the Pugwash goals -- as identified by him -- to eliminate nuclear weapons, indeed to eliminate wars as means of settling conflicts. During his long life certainly some progress has been made in both directions, but much more remains to be done, a task for us and especially for the younger ones among us. As I am sure he is well known to all of us here -- he has been the main figure in Pugwash throughout and a mentor to most of us -- I will say no more about him now.*

*The second individual I would like to single out as exemplary is **Edoardo Amaldi**. He collaborated with **Enrico Fermi** in the scientific breakthrough that opened the way to unleashing the energy stored in atomic nuclei -- to produce energy for useful purposes, but also nuclear bombs. He remained in Italy when other members of that research team -- **Fermi** himself, **Emilio Segré** and **Bruno Pontecorvo** -- had to escape when fascist Italy began to import the racial policies of nazi Germany. **Amaldi** also considered the possibility to emigrate to America, but opted against doing so because he did not wish to occupy any academic position there that might rather be taken by Jewish colleagues who had to escape from Europe. After the war **Amaldi** was the key figure in the reconstruction of physics – and not only physics, other scientific disciplines as well – in Italy and indeed in Europe. He always had a keen interest in nuclear disarmament – for instance we*

*fought, together (myself being indeed the junior partner) and with most other Italian scientists, the campaign to obtain that Italy sign and ratify the Non Proliferation Treaty. He was as well interested in the worldwide promotion of human rights, focussing especially on the plight of scientists persecuted for political reasons, because he felt he could be more effective in intervening on their behalf than in helping entire populations. He was a good friend of **Rotblat**, and as a leading statesman of Italian and European science he was invited to the very first meeting in Pugwash in 1957: although he could not attend due to other commitments he was soon drafted to be a member of the Continuing Committee -- as the governing body of Pugwash was then called -- on which he served until 1972 when he resigned to cut down on his international engagements in order to spend more time with his handicapped wife. He was instrumental -- while serving as President of*

*the Accademia Nazionale dei Lincei -- to arrange for the Academy to host the Pugwash Rome Office in its premises, a most convenient venue out of which the international activities of Pugwash are organized to this day by **Claudia Vaughn** -- as all of you participants to this Pugwash Conference well know.*

These two men are examples of the individuals who shaped Pugwash. Their stature -- their place in history -- is clearly much higher than most of us can aspire to attain in our own lives. Yet these are the standards by which our own goals in life -- and our roles in the future of Pugwash -- must be measured."

- **January 4, 2007:** An op-ed entitled "**A World Free of Nuclear Weapons**" is published by *The Wall Street Journal*. Its opening sentence reads as follows:

"Nuclear weapons today present tremendous dangers, but also an historic opportunity. U. S. leadership will be required to take the world to the next stage --- to a solid consensus for reversing reliance on nuclear weapons globally as a vital contribution to preventing their proliferation into potentially dangerous hands, and ultimately ending them as a threat to the world."

And its last sentence states:

"We endorse setting the goal of a world free of nuclear weapons and working energetically on the actions required to achieve that goal, beginning with the measures outlined above."

The most significant fact about this article is its authorship: **George P. Shultz, William J. Perry, Henry A. Kissinger** and **Sam Nunn**, a bipartisan group of 4 American senior statesmen of the highest rank. This article was a follow-up to a conference organized at the Hoover Institution in California by **Shultz** and by our colleague **Sid Drell**, and was endorsed by a galaxy of other American experts in foreign policy and nuclear strategy who had attended that meeting, convened "*to reconsider the vision that Reagan and Mr Gorbachev brought to Reykjavik*".

Another analogous Conference was convened in **October 2007**, and the same quartet then published (**January 15, 2008**) another article in *The Wall Street Journal*, entitled "**Towards a Nuclear-Free World**". In it they detailed a series of measures to be taken in that direction.

Analogous stands have then been taken by many other statesmen in the USA, including senators **McCain** and **Obama**, and all over the world, including the **Prime Minister** of the **United Kingdom**, the **President of France** and other statesmen and NGOs. Some initiatives have also been taken to prepare the transition to a nuclear-weapon-free world: for instance the **Minister of Defense** of the **United Kingdom** has offered that their nuclear-weapon laboratories at Aldermaston host a group of nuclear-weapon experts from the USA, Russia, France and China to investigate the technicalities of the verification of nuclear weaponry. Without wishing to convey an excessively optimistic message on the achievement of the final goal --- a Nuclear-Weapon-Free World, a world where major conflicts are no more settled by war --- I think the importance of the recent developments should be highlighted: the transition of this goal from

utopian hope to political plan, based on the recognition that moving in this direction is in the interest of the major countries, inasmuch as the inevitable alternative --- a worldwide breakdown of the nuclear-weapon nonproliferation regime --- entails unacceptable risks for everybody. Also in Italy there have been pronouncements in this direction.

- **24 July 2008:** *Il Corriere della Sera*, the main Italian newspaper, publishes an article co-signed by a bipartisan group of 4 eminent politicians (see below) and a scientist. Let me end my presentation by reading to you a text in English which is an almost *verbatim* version of that paper; it was submitted to the *International Herald Tribune* but was not considered by them sufficiently novel to justify publication (presumably newspapers are very keen to be the first, and not the second, to publish a paper, significant at it might be...).

“Towards a Nuclear-Weapon-Free World

In an article published in January 2007 in the Wall Street Journal a bipartisan quartet of eminent American statesmen -- George Shultz and Henry Kissinger, Secretaries of State with Presidents Reagan and Nixon; Bill Perry, Secretary of Defense with President Clinton, and Sam Nunn, long standing Chairman of the Defense Committee of the US Senate -- outlined the vision of a Nuclear-Weapon-Free World (NWFW) as a desirable, indeed indispensable, goal. They cogently argued that, unless the nuclear-weapon countries -- and in primis the two main ones, USA and Russia -- start a process to move towards the elimination of nuclear weaponry, the acquisition of nuclear weapons by many other countries besides the eight ones that now possess them will be unavoidable. This, in turn, would entail an intolerable risk that such weapons eventually be used with catastrophic consequences. The argument was reiterated by the four one year later, in January 2008.

A growing consensus is gradually emerging worldwide. In the USA, a NFWF has been recognized as an important goal by both presidential candidates and by a majority of those who have served in key positions in the field of national security. In Russia, Gorbachev immediately expressed his agreement, while the official leadership, albeit more cautious, is not negative. In the UK, Prime Minister Gordon Brown came out in favor; the Defense Minister offered at the Geneva Disarmament Conference that a study group, including experts from the 5 official nuclear-weapon countries (USA, UK, Russia, France and China), be hosted at the British nuclear-weapon establishment, to identify methods to verify the elimination of nuclear weapons; at the end of June a bipartisan quartet, including three former Foreign Secretaries and a former Secretary General of NATO, expressed their support in an article in the London Times. In France, the recently issued White Paper on defense indicates the elimination of nuclear weaponry as a goal to be pursued. In Australia the government has announced the formation of a new International Commission to map the path towards a NFWF. And there have been innumerable supportive statements by Non Governmental Organizations, such as the Luxembourg Forum, an international group of experts based in Moscow which convened recently in Rome.

We want to attest the broad support in Italy, both across the political spectrum and in the scientific community, for this important development.

We are of course fully aware that the route leading to the elimination of nuclear weapons is long and that to achieve this goal a dramatic change of the political climate has to take place. There are however some steps which would be very useful to promote a more favorable environment.

The first is the entry into force of the Comprehensive Test Ban Treaty banning all experimental nuclear explosions, thereby consolidating the current moratorium not supported so far by the force of an international treaty and its full verification machinery. It would also be important to overcome the stalemate of the negotiation at the Geneva Disarmament Conference on a Fissile Material Cut-off Treaty, so as to arrive at a treaty-sanctioned prohibition of the production of the basic materials to manufacture nuclear explosive devices, Highly Enriched Uranium and separated weapon-grade Plutonium. Here too a de facto moratorium prevails, as declared by the USA, Russia, the United Kingdom, France (and perhaps China), that needs to be consolidated in a Treaty and its verification procedures.

These two Treaties would certainly be welcomed by the Non-Nuclear-Weapon Countries and would facilitate a positive outcome of the next Review Conference of the Non Proliferation Treaty (NPT) in 2010, thereby reinforcing the worldwide nuclear-weapon non proliferation regime, including a universal monitoring of its respect -- both formally and substantially, in letter and in spirit.

Apart from these specific steps, a substantial improvement is necessary in the relations among the two nuclear superpowers, USA and Russia, which -- in spite of their recent reductions -- still possess among themselves more than nine tenths of all existing nuclear weapons. They must therefore take the leading responsibility to make additional reductions proceeding towards the complete elimination of nuclear weaponry. In this context the other three official Nuclear-Weapon Countries -- as recognized by the NPT: United Kingdom, France and China -- must also play a role, as indeed they declare to be eventually ready to do. And it is necessary that confrontational tensions abate in the areas where the risk of nuclear explosions is greater, maybe even by subnational terrorist groups. We refer in particular to South East Asia (India and Pakistan) and to the Middle East (Israel, Palestine, Iran). In turn, in both these contexts an indication of progress towards a NFWF is likely to have a positive influence.

Italy and Europe can and must play their role to foster initiatives and agreements which may help to create the conditions conducive to the goal of eliminating nuclear weaponry. A new way of thinking -- a new common wisdom -- is a fundamental step in this direction. We hold that on these issues, essential for the very survival of humankind, a superior, common interest must be recognized, in spite of natural political differences."

Francesco Calogero, a theoretical physicist, served from 1989 to 1997 as Secretary General of the Pugwash Conferences on Science and World Affairs, (1995 Nobel Peace Prize "for their efforts to diminish the part played by nuclear arms in international politics and in the longer run to eliminate such arm").

Massimo D'Alema, MP, served as Prime Minister of the Italian center-left government from 1998 to 2000, and as Foreign Affairs Minister of the Prodi center-left government from 2006 to 2008.

Gianfranco Fini, MP, served as Foreign Affairs Minister of the center-right Berlusconi government from 2004 to 2006 and is currently the President of the Italian Parliament.

Giorgio La Malfa, MP, served as Minister of European Affairs of the center-right Berlusconi government from 2005 to 2006.

Arturo Parisi, MP, served as Minister of Defense of the center-left Prodi government from 2006 to 2008.