EINSTEIN'S LEGACY - EINSTEINS ERBE

Yehuda Elkana

Opening lecture for Germany's Einstein Year, on 19 January 2005, 7 p.m. at the Deutsches Historisches Museum, Berlin, under the patronage of Chancellor Schröder.

THESES

Germany has chosen to dedicate this year, 2005, to Albert Einstein on the 100th anniversary of his 'annus mirabilis'. It is dedicated to the man Einstein, a German and a Jew who had to leave Germany because of the Nazis, never to return – a sheer accident that he did not perish in the Holocaust ; it is also dedicated to his scientific oeuvre, and to his humanistic, political and science-political legacy. It is a courageous and noble decision in which Wissenschaft, Kultur und Wirtschaft participate. It is courageous because Einstein was a very independent critical spirit, who claimed not to belong to any nation or culture, although he was very consciously a Jew. Thus, this is a major opportunity and not less so also a major challenge.

Einstein looms large on the horizon of many a laborer in the combined areas of science, technology, industry, the media, but also in the humanistic departments of Academe.

Out of the myriad of themes one could choose for discussion – all of which would contribute to admiration, to a love of science and research, to a dedication to freedom, democracy, international cooperation and an unprejudiced egalitarianism towards all and everybody in the whole world, I have decided to choose one central theme - that of

Befreiung - and to follow in a brief survey the implications of this attitude in many walks of life, from science to politics.

Einstein was a Freigeist, and his self-appointed, conscious task was to be a liberator – a Befreier. In this he continued a great German cultural tradition established by Kant, Goethe, and simultaneously with Einstein, by Ernst Cassirer.

Einstein was a Befreier from all conventions, constraints, limitations – from everything that might be in the way of a free rein of the imagination (Fantasie).

Einstein's all-important five papers, all written in the period of a few months in 1905, while he was a clerk in the patent office in Bern, and thus not part of a university, were the first clear demonstration of using his unfettered imagination.

For him no established Truth looked sacrosanct; he started by challenging the very foundation of successful modern science, namely Newtonian Mechanics. And already then he showed that creative thinking could proceed liberated from any support, be it experimental or even mathematical: it was a pure conceptual flight of the imagination.[1]

A few years later, after having been invited to Berlin by Fritz Haber, Max Planck, Walther Nernst and Max von Laue, the First World War erupted, and with it came a popular support for the war which bordered on mass hysteria - a 'madness' as Einstein described it - supported fully by the leaders of the academic and cultural elite. While 93 leading academics signed a war-supporting "Aufruf an die Kulturwelt", Einstein again

[1] Newtonian mechanics was critically questioned by Goethe too, but less so on an acceptable scientific basis.

showed his independence from any constraints or social pressures, by being one of only four who signed an "Aufruf an die Europaeer" deeply disapproving of the war.

As against the entire scientific establishment, Einstein thought and taught that there was no such a thing as a scientific method, thus liberating scientific work from a strongly constricting pedagogical principle, which then, like very often today, cut the wings of imagination of many a budding creative scientist, crushing very often the inherent curiosity and potential love for science. This should not be read as an invitation to work unmethodically, or in a disorderly fasion, or not to let an a priori method curtail 'the inquiring spirit'. For many a young person today such a constraint results in turning away from science and technology altogether. Rather, Einstein thought of himself as a methodological 'opportunist' free of any methodological constraints; indeed much of his work would not have been possible had he struck to a single, conventional 'scientific method'.[2]

It belongs also to the liberation from the conventional scientific method, that Einstein, like his followers, gave equal importance to experiment and to theory. The spectacular confirmation in 1919, by a British scientific expedition, of Einstein's General Theory of Relativity, predicting that the sun's gravitational field is capable of bending light, made Einstein into an iconic figure overnight. It was Einstein's liberation from all constraints that enabled him to propose this theory without relying on any empirical evidence[3] or

[2] This view is fully endorsed in Einstein's spirit by many a great scientist today, among them one of the greatest physicists alive today, Steven Weinberg: "We do not have a fixed scientific method to rally around and defend". In "Facing Up", Harvard U.P. 2001 p. 85.

[3] Diana Buchwald, the editor of the Einstein papers, was kind enough to supply the following elucidation, for which I am grateful: "Actually, the anomaly of the perihelion motion of Mercury was known for a long time; Newton had predicted a "classical" bending of light, and thus the problem was the ability of observation to distinguish between the Newtonian and the relativistic bending through observation & measurement; the third test, the red-shift, was for him the crucial one – and that took a long time to be confirmed, but AE worked mightily to induce astronomers to carry out these red-shift

even a sufficiently convincing mathematical scaffolding which we tend often to identify with theory. As he put it, [speaking of Max Planck]: "… he really did not understand physics, [because] during the eclipse of 1919 he stayed up all night to see if it would confirm the bending of light by the gravitational field. If he had really understood the general theory of relativity, he would have gone to bed the way I did".[4]

Einstein was not an anarchist, and he did not think that in science, or for that matter in politics, 'anything goes'. Imagination must be given free rein, but in due course the resulting theoretical edifice must be subjected to the control of the senses and the experimental result.[5] That was an integral part of his realism, his belief that out there a real world existed independent of and uninfluenced by human intervention or even knowledge. Reality was deterministic in the full classical sense. He could never accept a statistical interpretation of nature, which brought him into a life-long struggle with the greatest scientists who developed Quantum Mechanics in this direction, a field which was built on the foundations of Einstein's own ideas, published in one of the famous papers of the year 1905.

Einstein freed science and philosophy from the ruling positivism of the 19-th and early 20-th centuries. Positivism was a deep cultural commitment to facts and to the primacy of facts over theory, and to the belief – with Charles Dickens's Thomas Gradgrind in Hard Times, who said famously 'fact, fact, fact' – that facts need not be interpreted,

---

measurements. He raised funds for Grebe and Bachem to this purpose and he wrote to Eddington and others. The whole period after the Fall of 1919, he is preoccupied with this 3rd empirical confirmation.

[4] Alice Calaprice: "The Expanded Quotable Einstein" Princeton U.P 2000, p.97 – A. C. takes this from Ernst Straus in G. Holton and Y. Elkana: "Einstein: A Centenary Volume," Princeton U.P. p. 31; such quotes are hard to verify… Steven Weinberg discussing Einstein's prediction of the bending of light by the sun, formulated in the same spirit "…it is true that the theorist does not know the experimental result when she develops the theory, but on the other hand the experimentalist does not know about the theoretical result when he does the experiment." In "Dreams of a Final Theory", Harvard U. P 1993 pp. 96-97.

they are independent of any context. As mentioned above he wanted to allow free rein to the imagination, albeit to be controlled AFTERWARDS by observation and experiment, although not giving to any experiment an immediate veto right on fantasy and the emerging theory.[6] Yet the issue is very relevant today and for all of us: we are living in a world where facts, political facts, are not heeded.. Think only what such an attitude means when we are dealing with peace and war and the lives of millions of people.

Einstein's understanding of himself was that he had aspired all his life – and succeeded – to liberate himself from what he called 'the merely personal'. He contemplated the physical world at large – as well as the social world – uninfluenced by previous theory, by any dogma or by self-interest, with absolute, fearless courage and serenity. In his intellectual Autobiography, written in 1946, "The contemplation of this world beckoned like a liberation, and I soon noticed that many a man whom I had learned to esteem and to admire had found inner freedom and security in devoted occupation with it" (in German: "Ihre Betrachtung winkte als eine Befreiung, und ich merkte bald, dass so Mancher, den ich schaetzen und bewundern gelernt hatte, in der hingebenden Beschaeftigung mit ihr, innere Freiheit und Sicherheit gefunden hatte.")[7] Later, after he arrived in Berlin, he became a central figure on the academic scene – even before he became a legendary figure in 1919 – and he reacted with Olympian distance from the merely personal – in spheres other than that of the family and friends. The war broke out

[5] As against this pose of "Olympian" certainty, actually Einstein seems to have been quite anxious. See the introductions to vols. 7 and 9 and the correspondence in vol. 9, of the CPAE.

[6] Leading scientists, among them the founders of the recent string theory, followed in Einstein's footsteps, and very often abandoned Einstein's staunch realism; for them mathematical elegance and complexity takes precedence over evidence of the senses or of experiment. In this they are actually going beyond Einstein's scientific legacy, and only time will tell who will have been right.

[7] Paul Schilpp, ed.: "Albert Einstein: Philosopher-Scientist", Evanston, Ill., Library of Living Philosophers, 1949. This volume opens with the Autobiographical Notes. p.5

and Einstein felt morally called upon to promote political and social causes. Einstein can serve as a beacon of how to stand up defending democracy and social justice. He became deeply engaged: he signed petitions and expressed opinions, joined associations and groups of activists, all in the fight against the war, for the sake of international cooperation and for using human knowledge for peaceful purposes. And yet he did all that, while looking at this very process with a distant calm. As usual, Einstein reflected upon his own behavior and documented it. On 19 of August 1914 he wrote to Paul Ehrenfest in Leiden: "Europe in its madness has now begun something beyond belief; in a time like that, one sees what a wretched animal species we belong to. I am quietly, sleepily pursuing my peaceful ruminations and feel only a mixture of pity and disgust".[8] Perhaps he never believed that his efforts could possibly bear any fruit, perhaps, even probably, had he not chosen that attitude, he would not have been able to bring his scientific-theoretical efforts to fruition. Yet it leaves us in a moral dilemma: it is Einstein's legacy to us to be as engaged in the humane causes as he was all his life. But in today's world this may not be enough. The distant attitude, being liberated from the 'merely personal' leaves much to be desired, which we should not consider as Einsteins Erbe. While he allowed himself to use his imagination to think through (not so much to feel through) all matters – scientific or moral - and freely, and indeed in a very engaged manner, spoke about it and tried to influence colleagues, the public, and governments, there was a lack of a personal 'what follows'. I do not mean only in the sphere of his personal and family life; I mean in politics too. For example, having spoken out strongly against the war and also having criticized Haber publicly, Einstein continued to sit in the room next to his friend Fritz Haber, who had just discovered poison gas manufacture on large scale and put it at the service of the German war machine, and continued his

[8] CPAE 8A ,1988, p. 56, quoted by Fritz Stern: "Einstein's German World," Allan Lane 1999, p. 115.

friendship and daily contacts with him as if all this had nothing to do with personal relationships.

Almost hundred years later, after two world wars, after Hitler, Coventry, Dresden, Hiroshima, Gulag, we cannot afford this Olympic distance, irrespective whether we believe in the immediate efficacy of our actions.[9] Max Brod, who had met Einstein in Prague, published a biography of Kepler modeled on Einstein. It bordered on a caricature of the cold scientist who obsessively cares only for his theories.[10] If we go beyond Einstein in our demands on ourselves and our age, we still follow in Einstein's footsteps when we look courageously in the face of the historical mirror and, free of conventions, we make normative claims.

I would not have emphasized this need to go beyond Einstein, while learning from him, had it not been so relevant for our times: we live at a time when those with strong right-wing social and political attitudes, are full of energy for action, while the center-liberal academic and intellectual circles have almost abdicated. This is strongly the case in America, but it is beginning to be felt in Europe too: here most intellectuals in Academe – right or left – seem to have abdicated. In order to overcome this apathy, or feeling of helplessness, it is not enough to think through rationally what should take place, while personally continuing our routine daily lives; we must feel it through and act on the normative demand of 'what follows'. There is a need for the value-free scholar to yield to the actively 'caring scholar'. This is of paramount social and political importance.

[9] More on these aspects in Thomas Levenson's book: "Einstein in Berlin", Bantam Books, 2003, p.85.

[10] In Philipp Frank's masterly "Einstein: His Life and Times" NY 1947. According to Frank, Brod, in his novel "Tycho Brahe's Path to God"… was fascinated by the physicist…thinly disguised as the character Johannes Kepler…To Brahe, Einstein/Kepler was a terrifying enigma. The character he saw was single-minded, virtually fanatic in the pursuit of the

The Federal Government of Germany called for a culture of innovation, and for the creation of a much more creative and efficient higher education system in Germany, and even for a new social contract between "Wissenschaft, Wirtschaft and Gewerkschaften" to create 'partners for innovation'. This call is activist in its very formulation, and not a placid reliance on the forces of the market to do the job. It is certainly what Einstein would have endorsed in general and in detail: high-level education – and he was very critical of the universities of his times, especially in Switzerland and Germany – and strongly innovative science and technology as well as daringly new humanistic scholarship, were very close to him. It is not an accident that many technical innovations, from electronics to lasers and photo-based effects derive from his theoretical work. However, here too, in the spirit of this legacy, we must go beyond what Einstein could or would have thought about.

The quest for innovation has to be liberated from being couched in the merely actual; it needs planning on a much longer time-scale than the usual horizon of industry and/or politics. Globalization, the acute problems of poverty, socially spreading diseases like HIV/AIDS, multi-drug-resistant-tuberculosis, malaria - which all thrive on acute social and economic inequality and poverty - need long-term rethinking way beyond the intellectual scope that the two-hundred year long tradition of Enlightenment thinking has presented us with. Einstein had the right intuitions, but not the conceptual tools to show us the way how to rethink our heritage. This rethinking has to face a world where none of our convenient dichotomies hold: the precise separation between Church and State; sharp distinction between nature and culture; clear distinction between the local, and a strong quest for the universal neglecting the local; misreading the local Western universals for the genuinely global; all this is gone and we have to cope with the

---

truth and fully willing to pay the consequent price…" Levenson, op.cit. p.99, relates that "When the book appeared in

problems as we try to repair the ship of our conceptual tool-kit while floating in mid-ocean.[11] And this can be achieved only – and this Einstein knew in depth – if our knowledge of the world is based on reflection and is contextualized. When broken down this means:

The quest for innovation has to be liberated from the constraining, and, in the final account, short-sighted, separation between basic and applied research. Einstein's own work, and his writings, reflecting about research, as well the rich and relevant body of recent, sophisticated, history and philosophy of science, amply demonstrate the mutual interdependence of basic research and applied research. Industry used to know this when it fared economically better. Now, under economic constraints, it forgets its own glorious achievements which mostly followed from not separating basic from applied research. The area of study, which aptly catches these historical developments and what follows from them, could be called 'political epistemology of research'. The leaders of the Max-Planck-Gesellschaft (symbolizing basic research) and the captains of industry should work from the same headquarters, so to speak.

Following on these lines, it would be important to encourage private Foundations to promote innovation and to create nurturing contexts for recognizing and supporting talent; or perhaps to establish a new Foundation specifically with such a mandate?

Not instead of being better funded, but in addition to it, the universities have to rethink the meaning and process of doctoral studies even in the natural sciences, not to speak of the social sciences and the humanities. What Einstein teaches us is that doing science cannot be separated from reflection upon science, by the same scientist and while doing science; it is not enough that philosophers of science be responsible for epistemology,

---

1915, Nernst is said to have told Einstein, "This Kepler is you." Moreover, Einstein did not disavow the book.

while scientists stop being engaged in epistemology, or, at best engage in it after their retirement, when they can no longer influence their own creation of new knowledge. Let us remember that creating new knowledge, and at the same time continuously contextualizing it, was part and parcel of a rich European and German tradition before Nazi times. All great thinkers, in all branches of knowledge, tended to reflect publicly about their own work. This was absolutely fundamental for Einstein: "When I think of the most able students I have encountered in my teaching – I mean those who have distinguished themselves not only by skill but by independence of thought – then I must confess that all have had a lively interest in epistemology".[12] But not only Einstein: Bohr, Born, Heisenberg, Poincare, Pauli, Max Weber, Durkheim, Schrödinger, Delbrück, Kafka, Musil, Hadamard, Piaget, Picasso, Braque, Matisse, Klee, to name only a few, were like that. Many, but not all of them were Jews. Yet the Nazi regime eliminated all that. Some of this tradition migrated to and flourished for a while in America. After the war, Europe, but mainly Germany, consciously rebuilt first of all the positive areas of knowledge: Physics, Biology, History, Sociology. There was not much attention given to the reintroduction of reflection/epistemology into the training of doctoral students, and little attention paid to rebuild the reflective disciplines par excellence such as History of Science, or Comparative, Cognitive Anthropology. Indeed History and Philosophy of science were latecomers to Germany, with the establishment of the Max-Planck Institute in Berlin ten years ago; even today, German universities are abolishing Chairs in History of Science to their and the country's own peril. For a while, in a globalized world, this could be ignored – America nurtured such reflection for the entire 'Republic of Letters'. But this is becoming weaker by the day. If Europe and Germany will not take upon themselves this part of Einstein's legacy, it will boomerang

[11] Following the brilliant metaphor of Otto Neurath.
[12] A. Einstein: „Ernst Mach", Physikalische Zeitschrift 17 , 1916.

on science, universities, and indeed on innovation. This is not the place to enter into details on doctoral training, but what was said must reflect on that too.[13]

Innovation cannot thrive without Science and the Humanities, being mutually dependent, fertilizing each other. Epistemology, historical consciousness, the ability to contextualize – in short the very process of reflection – is an exercise in humanistic thinking. A typical humanistic remark of Einstein: "The school should always have as its aim that the young person leaves it as a harmonious personality, not as a specialist'.[14]

A prerequisite for successful innovation is international and interdisciplinary cooperation; not in form of after-dinner speeches, but de facto, by the way research teams are constituted in universities and industry, and not only between countries in Europe and America, but involving China, Japan, India, Africa and Latin America. During the First World War Einstein continued to visit scientists in neutral countries like Switzerland and Holland, and after the war actively engaged in and strongly supported international collaboration, especially with French and British scientists, which angered many of his compatriots. (This was strongly emphasized by Jürgen Renn in the recent collection of articles on Einstein in Die Zeit.) Today, in our globalized world, this injunction applies to the whole world, and many diverse civilizations. Einstein's approach from a very early age embraced all nations, religions, cultures and different types of knowledge. In a somewhat old-fashioned formulation – today its

[13] See my paper written for the Carnegie Foundation for the Advancement of Teaching to be published by them this year: "Rethinking the Doctorate in the Sciences in America"; it is already on their web.

[14] "On Education" in 'Out of My Later Years', NY 1950, p. 39; in 1921: " It is not so very important for a person to learn facts. For that he does not really need college. He can learn them from books. The value of an education in a liberal arts college is not the learning of facts, but the training of the mind to think something that cannot be learned from textbooks' P. Frank. op.cit. p.185; and with advanced age, in 1952, "Otherwise, he – with his specialized knowledge – more closely resembles a well-trained dog than a harmoniously developed person." In NYT, October 5,. 1952.

choice of words would not be politically correct – in 1934, Einstein said: "In the teaching of geography and history, a sympathetic understanding [should] be fostered for the characteristics of the different peoples of the world, especially for those whom we are in the habit of describing as 'primitive'." [15]

Finally, it is an important legacy of Einstein to take popular science seriously, and to encourage it being written by excellent writers who know science and reflect upon it. It is well-known that Einstein ascribed his early awareness of problems, and his overview of them, to having read at an early stage the series of popular science books by Aaron Bernstein. These books left a deeper mark on him than is usually acknowledged.[16]

We talk much nowadays of the 'public understanding of science': often it is presumed by working scientists – even by some of the best of them – that the issue is a popular explanation of technically difficult points like how a nuclear reactor works, or what in technical terms constitutes cloning. But they are wrong: what the public needs is an argument about problem-choices, the place and importance of chosen problems in the context of social needs but also of the map of the state of science, risks and chances. All this presupposes the ability to contextualize and to reflect upon science, for which scientists are not being trained. This is a typical humanistic exercise, and can be best taught to science students by historians, philosophers, and sociologists of science. Parallel to the need by the new partnership to rethink the public understanding of science, energy must continuously be spent on expanding the 'open access' to knowledge movement, which is a necessary prerequisite to be able to act globally, and to counteract widespread poverty in the world by empowering the poor with usable

[15] A. Calaprice op.cit. p. 68
[16] See Juergen Renn's "In der Kirche der Wissenschaft" in the Frankfurter Allgemeine Sonntagzeitung, 22 December 2002.

knowledge, and give them the knowledge-based tools for 'aspiring'[17] and finding their 'voice'.[18], [19] Obviously making these demands considering the present historical moment, we are extrapolating from Einstein's legacy, but we remain firmly in the realm of Einstein's spirit.

Much has been said recently – but often channeled in the wrong direction – about 'elite education'. The bad name of 'elite' stems from the historical concept of hereditary elites, enjoying unjustified social status and financial privileges. In Einstein's spirit, an elite is constituted by individuals who know how to strive for ever higher, self-imposed standards of quality and achieve beyond what their background would have pushed them to achieve. Through its overemphasis on democratic accountability in the name of transparency, the present social system stands in the way of the emergence of such a self-appointed elite. Not that accountability and transparency are not needed, but elites must be free to exercise judgment – it is an essential part of the task of an elite - and this task is by definition non-democratic. That is what is meant by the repeated emphasis that universities – elite universities – must be meritocratic. Einstein: "This more aristocratic illusion concerning the unlimited penetrative power of thought has as its counterpart the more plebeian illusion of naïve realism, according to which things "are" as they are perceived by us through our senses."[20] Einstein actually wanted to overcome both illusions by leaving free run to the imagination but then to root the results in the empirical.

[17] As Arjun Appadurai puts it.
[18] As Albert Hirschmann had formulated it.
[19] The fact that the pharmaceutical industry enabled cheap 'coctail' for AIDS patients in India, Africa and elsewhere by changing their patent rights, is a tell-tale case.
[20] 'Remarks on Bertrand Russell's Theory of Knowledge' in Schilpp (ed.): Albert Einstein- Philosopher-Scientist, 1949.

These were aspects of Einstein's role as 'liberator'. Actually, all exemplify liberation from authority – any authority – is an important part of Einstein's legacy. Already in 1901 he said in a letter "German worship for authority (Autoritaetsdusel)… is the greatest enemy of truth".[21]

Later, when writing his intellectual Autobiography for the Schilpp volume in 1946, he described his characteristics as: "Suspicion against every kind of authority …a skeptical attitude towards the convictions which were alive in any specific social environment…" (Das Misstrauen gegen jede Art Autoritaet… eine skeptische Einstellung gegen die Überzeugungen, welche in der jeweiligen sozialen Umwelt lebendig waren…")

Scepticism against authority is a prerequisite for having elite universities. In the world of ideas *'what counts is what is said, and not who says it'*. In this area much is to be learned from the best universities in the US and Great Britain, which are indeed the best universities in the world, on any scale of comparison. We should be very careful to distinguish our European political critique of America from the justified admiration for America's achievements in innovation, R&D, and a non-bureaucratic and anti-hierarchical climate of research.[22]

[21] In another translation by Peter Galison…"authority gone to one's head is the greatest enemy of truth; to Jost Winteler 8 July 1901. The full quotation is very interesting: in a communication, Diana Buchwald informs me as follows: "Was Sie ueber die deutschen Professoren gesagt haben, ist gar nicht uebertrieben. Ich habe wieder ein trauriges Subjekt dieser Art kennen gelernt – einer der ersten Physiker Deutschlands [reference to Paul Drude]. Auf zwei sachliche Einwaende, welche ich ihm gegen eine seiner Theorien anfuehrte, und die einen direkten Defekt seiner Schlüsse darthun, antwortet er mir mit dem Hinweis, dass ein anderer (unfehlbarer) Kollege von ihm derselben Meinung sei. Ich werde dem Mann demnaechst mir einer tuechtigen Veroeffentlichung einheizen [which he does that same year]. Autoritaetsdusel ist der groesste Feind der Wahrheit." CPAE, Vol. 1, Doc. 115, p. 310. And this comes in a letter in which he asks for a letter of recommendation from Winteler, and he is only 22 years old!"

[22] Gerald Holton considers Einstein's all-important need to generalize (mein Verallgemeinerungsbedürfnis) an aspect of his anti-hierarchical view. In "Einstein's Third Paradise" a chapter in a forthcoming book. Private communication.

Finally, can we associate Einstein with any established philosophical school? Einstein liberated himself, while actually engaged in philosophical reflection, from all philosophical schools. He called himself a philosophical opportunist. As Gerald Holton quotes him (from Einstein's reply to his critics in vol. II of Schilpp, p.684): "such a scientist, therefore must appear to the systematic epistemologist as a type of unscrupulous opportunist: he appears as a realist insofar as he seeks to describe the world independent of the acts of perception; as an idealist insofar as he looks upon the concepts and theories as the free inventions of the human spirit… as positivist insofar as he considers his concepts and theories justified only to the extent they furnish a logical representation of relations among sensory experience. He may even appear as Platonist…". Peter Bergmann, in personal reminiscences mentions explicitly: "A third thing – and I think it is something very rare today – was a tremendous capability of taking a step back in his scientific work and looking at it, as you might say, in the cold light of dawn".[23]

This attitude is important in the liberation of science from any specific method (as referred to above), but also in his politics, which to many seemed naïve. It was anything but naïve. I would characterize it as dialectical pragmatism.[24]

Einstein, in 1939 wrote to President Roosevelt warning him that Germany might be working on the development of an atomic bomb and therefore America should engage in research on it.[25] Then, after Hiroshima, he urged repeatedly nuclear disarmament –

[23] G. Holton and Y. Elkana (eds): Albert Einstein - Historical and Cultural Perspectives, Princeton U.P 1982, p. 398

[24] Klaus Meyer-Abich used the expression 'reflective pragmatism' describing Einstein's work as well as that of Bohr, in an article on "Bohr's Complementarity and Goldstein's Holism" in Mind and Matter, vol.2, 2004.

[25] "I understand that Germany has actually stopped the sale of uranium from the Czechoslovakian mines which she has taken over. That she should have taken such an early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weizsacker, is attached to the Kaiser-Wilhelm-Institute in Berlin where some of the American work on uranium is now being repeated." The letter is quoted in full in A. Calaprice, op.cit pp. 374-377.

this was neither unreasonable, nor naïve; it focused on the essential at each point of time. The same is true when he simultaneously supported the establishment of a Zionist state, and warned against emerging strong nationalistic tendencies among the Zionists. Both points were focusing on the absolutely essential.

If you permit me one personal remark: when I, as a Permanent Fellow at the Wissenschaftskolleg, or when standing here, as a Holocaust survivor, I enjoy the warm reception by German democracy today, I am following the spirit of Einstein. I love Israel and feel a deep loyalty towards it, and hope for its continued existence, and at the same time I warn against strong nationalist tendencies which may endanger the democratic character of the state (I never accepted that there can be such a thing as a genuinely democratic Jewish state, nor can any other religion-based state be fully democratic). This attitude is in the same spirit. And when I publicly called for 'The need to forget"[26], against the political manipulation of the Holocaust in Israel (by right-wing and left-wing governments equally), and at the same time I oppose tendencies by some in Germany who wish to 'close the chapter' of the Holocaust, I do not think that I am being inconsistent. Rather, I concentrate on the real issue in each context. Israel should leave to the individual the memory he or she wishes to keep up or even to cultivate, while Germany must continuously, publicly, remember that this chapter can and should not be closed.

One last remark, relevant to our days, which follows from Einstein's far-sighted approach to his own times:

---

[26] "The Need to Forget" appeared in the Israeli daily Ha'aretz on 2 March 1988.

During and after the First World War, Einstein was worried by the attitude of some of the most revered German intellectuals embraced the German Sonderweg which basically identified German culture with the War. This attitude turned out to be one of the greatest – because so influential – tragedies for Germany, and thus for world history, in the first half of the twentieth century. It is a warning signal against what may become, but can still be averted, an American, and thus a global, tragedy: a 'Sonderweg' expressed in the ominous ideology, of some speakers for the present prevailing political mood in America: "we do not need to heed the facts, we create Reality". This was repeatedly written and said with reference to not having found WMD in Iraq.

At the end of a quick tour, where I tried to derive from Einstein's life and thoughts, guidance for a love of knowledge and science, for democratic internationalism, for a science policy which encourages long-term innovation, for social and political engagement rooted in enlightened social partnership between the main pillars of society, I will conclude with a few crisp summary statements - all based on Einstein's legacy- to be taken away:

1) Universities and research institutions must receive more resources, but have to de-bureaucratize their administration, and have to develop an anti-authoritarian intellectual climate: "It counts what is said, and not who says it."

2) Allow for and encourage a free rein of the imagination in all domains of life, but hold the result under strict control of experience.

3) Embrace the idea of a caring scientist, to replace the anachronism of the value-free scientist.

4) There is no way to innovation or creativity, without contextualizing knowledge. Doing science and reflecting upon it is one and the same activity.

5) Dedicating this year to Einstein means encouraging a critical attitude towards science, society, culture and especially, war. A free-ranging imagination - accompanied by reflection, and relying on an all-persuasive critical spirit - will foster love of science, technology and innovation among people.