

A Nuclear Physicist's Memories of an Unsanctionable Future

Book 1: From Berkeley to a Small Enquiry

by

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Introduction

Berlin, 12th September 2016

In spring 2016 Barack Obama was the first President of the United States to visit, while in office, the Japanese city of Hiroshima, on which, seventy-one years previously, on the morning of 6th August 1945, the first atomic bomb had been dropped. There he made a speech which was reported in most German daily newspapers. At one point in his speech Obama spoke about the wish of “[o]rdinary people, [who] do not want more war. They would rather that the wonders of science be focussed on improving life and not eliminating it”. I have singled out this passage from the speech. The complete text, as recorded by the *New York Times*, can be found online (under Business Insider Deutschland/International) and is cited at the end of this introduction. With his words Barack Obama spoke from my heart. On the day he gave the speech I had already spent almost two years writing a collection of “letters” which I intended to collect together into a book. My main concern was to make an urgent appeal to young people in my country to keep an extremely vigilant eye on the nuclear weapons which still exist on our earth. In the 1980s the debates about nuclear weapons played a significant role in my life. I felt that my profession as a nuclear physicist imposed upon me certain responsibilities for the wellbeing, even safety, of our society and so I spent a great deal of time amassing arguments against the insane escalation of the arms race. However, I was not alone, but had fellow combatants in the fight against armament with nuclear weapons; and we were united in wishing nothing more fervently than the complete abolition of nuclear weapons. We did not get that far; we did not reach our goal; and, as I write this in 2016, many nuclear weapons still exist in our world. The circle that possesses nuclear weapons has even expanded: initially it consisted only of the United States and the Soviet Union, but now countries such as Great Britain, France, China, India, Pakistan and North Korea have officially joined them. Our life on this planet has not been made safer by nuclear weapons and for that reason we must not stop demanding that nuclear weapons be abolished or their numbers at least reduced. May our younger fellow men and women, those who follow my generation, enjoy greater success in mastering these tasks than we did!

On reading Obama’s speech I remembered an article by Roger Molander which had appeared in the American newspaper *Tribune/Today* on 28th March 1982. Roger Molander had just left his post as an aide in the service of the American government and become president of a

group which called itself “Ground Zero”. The name of the group alluded to the military tradition of detonating atomic bombs several hundred metres above the surface of the earth in order to enhance their damaging effects. “Ground Zero” describes the point on the earth’s surface over which the bomb is detonated. The group round Roger Molander had set itself the goal of enlightening the population of the United States — which had been kept in ignorance concerning questions of nuclear armament — about the consequences of a war in which nuclear weapons were deployed. Previously he had been a member of the American President’s staff, a nuclear strategist for the National Security Council. In his article Roger Molander wrote:

I watched three presidents who were deeply concerned about the problem of preventing nuclear war leave the White House with a sense of frustration. Each sought to leave American people with a legacy of security with respect to nuclear war, a confidence that nuclear war would not happen. Each failed.

When I read this I also thought of Jimmy Carter and it occurred to me that Barack Obama, who at the time was in the final year of his eight-year term of office, would probably leave the White House in 2017 nursing the same feeling of disappointment.

I know the feeling of failure from personal experience. In the 1980s I had opposed, with considerable commitment, any further increase in the mighty arsenal of nuclear weapons that had been accumulating since 1945. My efforts were crowned by only moderate success — or so it seemed to me at the time. The situation in Germany remained volatile since it was here that the concentration of nuclear weapons was greatest. These were the nuclear weapons on both sides of the Iron Curtain; and in the event of war these weapons would have been deployed in the precise location of the two German states which existed in the centre of Europe in the 1980s. Neither of the two German governments had voiced a clear protest against military planning of this sort. When, moreover, the then-Chancellor of the Federal Republic of Germany, Helmut Schmidt (SPD), campaigned vigorously to have the newly developed Pershing II rockets stationed on the territory of the Federal Republic, the political climate heated up still further. Chancellor Schmidt explained to the general public in his country that this further step in the build-up of arms was a response to the earlier installation of the Soviet SS20 rockets. When he asserted that the Pershing rockets were — on the basis of the NATO Double-Track Decision — a card that was being played in the game of armament-poker to force the Soviet government to engage in negotiations on the reduction of medium-range ballistic missiles — well, then the population really were in a state of complete anxiety. German citizens did not “buy” Schmidt’s argument because it seemed illogical to

them. During the time that followed more and more people turned up for demonstrations protesting against the renewed boost to the build-up of arms. I myself was one of them and in 1981 took part in the demonstration in Bonn, at that time the capital of the Federal Republic of Germany. I experienced Helmut Schmidt turning a deaf ear to the calls from a section of the population and not even altering his opinion when he was voted out of the office of Chancellor and became joint editor of the weekly paper *Die Zeit*.

However, there were people who heard the voices from Germany! Many of them lived in California, on the other side of the world, so to speak. I met some of them in Berkeley in 1982. Basically, this whole book is about meeting these people. I shall recount the zeal with which they strove to achieve at the very least a “freeze” on the arsenal of nuclear weapons, even if actual nuclear disarmament was not on the cards. The ears of these people in Berkeley were open when I wanted to talk about Germany becoming a desert contaminated by radio-activity in the event of a war involving even the limited use of nuclear weapons. This fear had arisen when I had learnt of the intention to deploy nuclear weapons if the Soviet Union and its allies, with their superior conventional armed forces, marched into the Federal Republic of Germany. Favourable terrain for an invasion was the “Fulda Gap” in Hessen, usually translated as “Fulda Lücke” in the German usage of the time. It makes more sense to talk about a valley basin near the city of Fulda through which hostile troops could launch an attack in the direction of Frankfurt am Main. In 2016 our friends Iris and Peter from Hanover showed us a further topographical peculiarity. They drove us to a small place called Heisterberg to the west of Hanover and there took me to a cemetery of the British Army of the Rhine, the Rhine Army Memorial. I walked along the rows of graves, read the names of the dead on the light-coloured tombstones and also learnt their rank in the Army or Air Force at the time of their death. In the fields of Flanders ravaged by the First World War I had seen the same thing: here, too, the gaily coloured flowers of an English country garden were planted on each individual grave. These were the graves of British soldiers who, as members of the British Army of the Rhine, had died while serving in Germany after the Second World War. The cemetery lay on the route of the British advance eastwards from the Rhine during the Second World War. “The Russian” would have had to go through here if, coming from the East, he had wished to reach the Rhine. That would have been made difficult for him as there were three lines of defence equipped with nuclear weapons: one on the Lüneburg Heath; then one along the course of the River Weser Line near Nienburg and Hamlin; and a third line near the city of Osnabruck. That is how Peter explained it to me on that day. A few months later a former member of the German Army who had been stationed in the Weser

Mountains confirmed that in case of emergency the plan had been to mount atomic warheads on the rockets of his units; these warheads would have been sent over from the neighbouring American arsenal. Military jargon used the term “dual capacity” for the technical possibility of firing both conventional and nuclear warheads with the same equipment. On this excursion to Heisterberg, then, I made one of those “finds” which I have incorporated into the account of my stay in Berkeley, California.

With this introduction I am playing the opening chords of the themes which will resound more fully within the subsequent narrative. Nuclear weapons furnish the central theme. The main compositional motif — and motive — in this text arises from the intention to write about the activities of the group known as the Hill Employees for the Nuclear Weapons Freeze, which I joined during my time in Berkeley. However, the writing of this text dragged on and, as it did so, more and more topical references — precisely the “finds” — were woven into the recital. Ultimately, the book has turned into more than just an account of historical events that took place between 1980 and 1989. The “finds” developed into an independent accompaniment to the historical “melody”. I found many tracks in books which I had bought in Berkeley and did not read until much later, when I had already retired; many are taken from newspapers and journals; others from German and English encyclopaedias; and I took just as many tracks from the physics and chemistry textbooks which were important in the exercise of my profession. Apropos, the arguments gleaned from the Sciences and from Medicine are the “chewiest”. In the course of debates about nuclear armament it became apparent that politicians had “cracked their teeth” on them.

In February 2017 I altered the text at this point and inserted the lines in the following paragraph. This is because I woke up during the night of 16th to 17th February and could only get back to sleep after I had decided to divide the book I was writing into a trilogy of three books. The most important passages in the first five chapters had already been set down on paper in 2014 and at that point I did not expect that, once again, confrontation could arise between two military blocs armed with nuclear weapons, a confrontation in which the doctrine of “mutually assured destruction” could play a role: the threat that in the case of an attack by one side the two sides would assuredly destroy each other by employing nuclear weapons. However, on 16th February I heard a piece on Deutschlandfunk (the German World Service) demanding the reinforcement of NATO’s nuclear weapons in order to prevent the Russians from marching into the Baltic States or Poland. The doctrine of deterrence had been dragged out of mothballs! This robbed me of my sleep. In the first five chapters of my

book I had reported on how the absurdities and dangers of this doctrine had been revealed in the 1980s. The doctrine had once again become the subject of political debate — and earlier than I had anticipated — and I felt the urgent necessity of publishing my text as quickly as possible. I hope that subsequently “an accurately informed public, sensing this threat to its survival, will act on its instinctive aversion to communal suicide”, as Peter G. Joseph, President of the San Francisco branch of Physicians for Social Responsibility, puts it in the film *The Last Epidemic* (Chapter 3).

During the writing of this book it became clear to me that the danger posed by nuclear weapons had been very real at that time. There were enough signs that something could go wrong. Basically, the “balance of deterrence” was not a balance of natural forces in a scientific sense. It was still people who were making the decisions to dispatch the bombers or rockets armed with atomic bombs. In Berkeley people at that time talked about the “writing on the wall” whenever a particularly serious warning was given about the danger of a nuclear war. In Germany people spoke about the “Menetekel”. The Aramaic words “mene, mene, tekel, upharsin” are the words of the oracle which were written by a human hand on the palace wall during a banquet given by the Babylonian King Belshazzar and interpreted by Daniel as pointing to the end of his [Belshazzar’s] rule and his empire: ‘This is the interpretation of the thing: MENE; God hath numbered thy kingdom, and finished it. TEKEL; Thou art weighed in the balances, and art found wanting. PERES; Thy kingdom is divided, and given to the Medes and Persians’.¹ Brockhaus states that the proverb “Gewogen und zu leicht befunden” [weighed and found wanting] is derived from this prophecy. However, I could imagine that the proverb actually refers to the “weighing of souls” depicted on many walls in Ancient Egyptian tombs. The book *Geheimnisvolles Ägypten* [*Secret Egypt*] contains an illustration of this type of Egyptian scene² and I refer to it in Chapter I of this book, when I make use of the Egyptian ritual in a somewhat unfamiliar way.

In Chapter 4, which bears the title “The Balance of Deterrence”, I take up the statements of a number of individual statesmen who were then in positions of responsibility. They expressed their fear that nuclear deterrence could fail in the long run. International equilibrium might be disturbed because many a strategist might have worked out that the employment of nuclear weapons would bring advantages for his country. The balance of deterrence could fail due to

¹ According to Brockhaus, they are “Orakelworte, die während eines Gastmahles des babylonischen Königs Belsazar von einer Menschenhand an die Palastwand geschrieben und von Daniel auf das Ende seiner Herrschaft und seines Reiches gedeutet wurde: Er (Gott) hat (das Reich) gezählt, gewogen, zerteilt” (*Brockhaus*, 20th edn (Leipzig 1996), vol. 14, p. 486, together with a reference to Daniel 5: 25–28, a passage in the Old Testament).

² Christian Delacampagne and Erich Lessing, *Geheimnisvolles Ägypten* (Eltville: Bechtermünz, 1991), p. 100.

new development in weapons technology; alternatively, the technical failure of one of the safety systems could accidentally cause a nuclear war. Each of these arguments was prompted by perfectly real events which had brought the world to the brink of a nuclear catastrophe, but at the time I merely suspected this rather than knowing it for certain. It was not until 2016 that I held in my hands the proof, black on white, of how close my hunch had actually come to being reality. While visiting a special exhibition with the title *Krieg* [War] in the Landesmuseum für Vorgeschichte [Museum of Prehistory] in Halle an der Saale I bought a catalogue. The subtitle announced “a search for archaeological clues”. That was not too ambitious a claim, as the exhibition was devoted to excavations of the battlefield at Lützen, where an extremely bloody battle had taken place on 6th November 1632 in the course of the Thirty Years’ War. The King of Sweden, Gustavus Adolphus, fell during the battle; his body was transported to Sweden and laid to rest in a crypt while the other fallen soldiers, who had been left behind on the battlefield, were buried in the Saxon earth by the farmers in the area. Their skeletons were discovered there in the twenty-first century, as they had been laid out together in serried ranks in a mass grave, except for one skeleton of a fallen soldier which had been placed with outstretched arms on top of the row of others. This last corpse looked like the crucified Christ; and the entire block of bones and soil, which had been dug up out of the ground and then exhibited, stood there in the museum as a “sinister altar”.³ In the preface to the catalogue Harald Meller, Director of the Landesamt für Denkmalpflege [State Office for the Preservation of Monuments], and Michael Schefzik, project leader for the exhibition *War*, wrote the following:

Erst in den letzten Jahrhunderten erfolgte eine Entwicklung der Kriegstechnik, die die Menschheit spätestens am 26. September 1983 an den Rand eines Atomkrieges brachte. An diesem Tag meldete der verantwortliche Offizier der russischen Kommandozentrale, Stanislaw Petrow, einen von der Satellitenüberwachung gemeldeten scheinbaren amerikanischen Raketenangriff regelwidrig als Fehlalarm. In diesem einen Fall siegten menschliche Intelligenz und Vernunft über die Zwangslogik militärischer Abläufe. Der Beginn des Ersten Weltkrieges wäre das erschreckende Gegenbeispiel.⁴

[It was only in the last centuries that the military technology developed which, on 26th September 1983 at the latest, brought humanity to the brink of an atomic war. On this day the duty officer at Russian Central Command, Stanislaw Petrow, acted contrary to

³*Berliner Zeitung*, 21st January 2016, p. 25.

⁴ Harald Meller and Michael Schefzik (eds), *Krieg, Eine archäologische Spurensuche* (Halle (Saale): Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, 2015), p. 16.

regulations by reporting as a false alarm an apparent attack by American rockets which had been reported by Soviet satellite surveillance. In this case human intelligence and reason triumphed over the tyrannical logic of military processes. The beginning of the First World War provides us with a terrifying example of the opposite.]

I suspect that there a number of such incidents, on the American side as well. Once again we only just escaped!

By 1980 at the latest the arsenal of nuclear weapons had become a threat to the continuing existence of humanity. Arms factories had continued production since the end of the Second World War and, year upon year, had increased the amount of explosive material which was incorporated into the over fifty thousand atomic bombs that were dispersed across the entire planet. The number comes from the American Admiral La Rocque, who cited it in the lecture he gave to the symposium of doctors in San Francisco. Shots from this symposium are shown in the film *The Last Epidemic* by Eric Thierman. Another speaker at the symposium, the doctor H. Jack Geiger, calculated in front of the conference that a bomb with an explosive force of one megaton of TNT (Trinitrotoluol) would have the same explosive effect as seventy bombs of the kind dropped on Hiroshima, “all at once, all in one place”. In my documents from work I found the “megaton map” which was hung up on various occasions by the “peace group” of the Hahn-Meitner Institute. Unfortunately, the author of the map is not named on the poster but I remember that the “Freeze” group in Berkeley had a similar poster, so the map was probably part of the inventory of the internationally networked “Bürger gegen den Atomtod” [Citizens against Death by Nuclear Weapons]. On the poster a total of 121 squares are drawn containing dots. The square in the middle contains only one dot and this single dot stands for all the explosive material used in the Second World War, including the two atomic bombs dropped on Japan. That amounts to three million tons of TNT, or three megatons. The accompanying caption says: “Der Zweite Weltkrieg dauerte 6 Jahre, zog jedes Land der Erde in Mitleidenschaft und forderte 50 Millionen Tote” [The Second World War lasted for six years, affected every country on earth and cost fifty million lives]. On the poster there are altogether six thousand dots. These six thousand dots symbolize the “Vorrat der Kernwaffen auf beiden Seiten” [stock of nuclear weapons on both sides] of the Iron Curtain, which by the 1980s had “auf ein Äquivalent von 18 000 Megatonnen TNT angewachsen” [grown to the equivalent of eighteen thousand megatons of TNT]. The poster also says: “Das entspricht dem 6000-fachen der im Zweiten Weltkrieg eingesetzten Sprengkraft” [That corresponds to six thousand times the explosive force used in

the Second World War]. This amount could destroy humanity more than once. The term “overkill” was coined to describe this state of affairs.

At that time the inhabitants of the United States discovered yet another source of terror: each of the fifty thousand atomic bombs in existence might explode due to a technical fault, without the responsible military personal intending this to happen, and as a consequence cause a catastrophe in the country which owned the atom bomb. Purely in order to reduce this risk many politicians pleaded for a reduction in the number of atom bombs. I have not discovered any official statistics for the probability of an atom bomb exploding due to a failure in its fail-safe systems. Thus, in Chapter IV I rehearse a possible scenario on the basis of plausible hypotheses.

In the final chapter of this book, Chapter V, I give an account of the Federal Government’s response to the “Kleine Anfrage” [small enquiry] directed by Petra Kelly (Green Party) to the Federal Government under the then-Chancellor Helmut Kohl. The enquiry concerns the safety of nuclear weapons and the possibility that considerable damage could be done to Germany in the case of an accident with these weapons, even if there were only a mild explosion and not a full-blown nuclear explosion. In a case like that the immediate surroundings could be contaminated by the release of the plutonium. The Federal Government did not comment on these questions and took refuge behind the shield of “confidentiality”. However, the matters referred to were by no means secret or confidential, as can be recognized from the fact that the authors of the “small enquiry” referred to documents which were openly discussed in the United States.

In Germany the situation changed considerably after 1989. The two German states were united into one state; there is no longer an internal German border densely dotted with nuclear weapons. However, nuclear weapons do still exist in Germany. The Federal German Government do not specify how many there are or where they are. Sometimes I read in the newspapers speculation that the weapons store is located in Büchel in the Eifel. That has not been confirmed by the government. They have also refused to answer the question of whether German Air Force pilots stationed in Büchel would, in a crisis situation, be given the order to mount atomic bombs under the wings of German Air Force planes and go into action thus armed. If I had once thought reunification had brought the time for a debate about nuclear weapons to an end, the longer I spent writing the more convinced I became that the danger posed by nuclear weapons is still present. While this danger may not be as blatant as in the 1980s, it becomes very clear in some of the individual finds I present.

Amongst the finds which I would like to discuss in greater depth is the book *Chernobyl Prayer* by Svetlana Alexievich, which received the Nobel Prize for Literature in 2015. For the subtitle of her book she chose “A Chronicle of the Future”. This provided the inspiration for the title of my book. In her introduction Svetlana Alexievich clarifies what her subtitle means: the accident with the nuclear reactor in 1986 released so much radioactivity into the reactor’s surroundings that everyone living there lost faith in their familiar natural environment and questioned whether it would be possible to go on living in it. They did not know whether the food they ate or the water they drank would kill them. The food which had seemed quite safe before the accident at Chernobyl could have been poisoned by the radioactivity. Svetlana Alexievich writes that for these people history was divided into two: the time before and the time after the accident in the nuclear reactor. I foresee the same thing for the age after a nuclear war.

In the 1980s much was written about the dropping of the atomic bombs on Hiroshima and Nagasaki. Discussions, too, were frequent and heated. I fear that the explicit nature of the depictions of the disaster led to many people experiencing a trauma which persists to this day. At some point people stopped talking about the events of the 1980s, which could have been sealed in a lead coffin of silence that is seldom opened even after all these years. How, in these circumstances, is the baton of watchfulness to be passed to the next generations? Will these generations heed the incitement to learn everything about nuclear physics which they need in order to counter those who appease and downplay? We must fight for a future in which people are never again harmed by nuclear weapons! And we should not sit silent while any politician promulgates the doctrine of “deterrence” through nuclear weapons.

I am writing this book in memory of and for my fellow inhabitants of this planet who have campaigned tirelessly for nuclear disarmament. And I write for the people in the United States who gave me a home for my opposition to nuclear weapons and who were so very different from the picture I had painted for myself on the basis of the information available about that distant country on the other side of Atlantic Ocean. I also write for the people in Europe who, after two devastating wars on their continent, mobilized all their strength and energy to prevent an even greater catastrophe being caused by the deployment of nuclear weapons. And I write for Presidents Mikhail Gorbachev and Ronald Reagan, who, although they really were keen on their posts equipped with nuclear weapons to the east and the west of the Iron Curtain, managed to muster so much faith in each other that they launched nuclear disarmament. And I am writing for Charlyn Wallbaum, a girl from Forst who engaged me in

a discussion about nuclear weapons when she observed me writing this book. I am also writing for Henning Mankell, who already knew he would die of cancer but in his book *Quicksand*⁵ still wrote the following words, which my wife read to me as I was sitting at the kitchen table and which brought tears to her eyes:

This book is also dedicated to the memory of the baker Terentius Neo and his wife, whose name we do not know. Their faces can be seen on a fresco in their house in Pompeii. Two people in the prime of their lives. They appear serious, but at the same time dreamy. She is very beautiful, but shy. He, too, appears shy. They seem to be two people who take their lives extremely seriously.

When in the year 79 AD the volcano erupted, they cannot have been left with much time to understand what was happening. They died in the midst of life, buried by the ashes and the red-hot lava.

Shall we have time to understand what has happened when the unimaginable comes to pass? If what must not happen were indeed to happen and blistering heat and ashes were to rain down upon us? What will be left of us then? Will it be more than a faint shadow on a stone (Chapter 3)?

I am almost at the end of the introduction and come full circle, back to the final passages from Barack Obama's lecture in Hiroshima. Obama advanced an argument against the dropping of the atomic bombs on Hiroshima which gives us hope for the future. He said: "My own nation's story began with simple words: All men are created equal and endowed by our creator with certain unalienable rights including life, liberty and the pursuit of happiness". Here, in 2016, the President of the United States of America cites these famous lines from the *Declaration of Independence of the Thirteen United States of America*, which bears the date 4th July 1776. He places the inhabitants of all nations on earth under the protective shelter offered by these words; and says that the dropping of an atomic bomb on any inhabitant of this planet must be prevented if we wish to live up to the ideal which is in harmony with the words from the Declaration of Independence. Obama considers this to be the most important duty of nations which possess atomic bombs. Obama goes on to say:

Realizing that ideal has never been easy, even within our borders, even among our own citizens. But staying true to that story is worth the effort. It is an ideal to be strived for, an ideal that extends across continents and across oceans. The irreducible worth of every person, the radical and necessary notion that we are part of a single human family — that is the story we must tell.

⁵ German version: Henning Mankell, *Treibsand* (Frankfurt am Main: Büchergilde Gutenberg, 2016).

That is why we come to Hiroshima. So that we might think of people we love. The first smile from our children in the morning. The gentle touch from a spouse over the kitchen table. The comforting embrace of a parent. We can think of those things and know that those same precious moments took place here, 71 years ago.

Those who died, they are like us. Ordinary people understand this, I think. They do not want more war. They would rather that the wonders of science be focussed on improving life and not eliminating it. When the choices made by nations, when the choices made by leaders, reflect this simple wisdom, then the lesson of Hiroshima is done.

The world was forever changed here, but today the children of this city will go through their day in peace. What a precious thing that is. It is worth protecting, and then extending to every child. That is a future we can choose, a future in which Hiroshima and Nagasaki are known not as the dawn of atomic warfare but as the start of our own moral awaking.

At one point this quotation from Obama's speech concluded the Introduction. It would still do so if I had not, at 9.10 on the morning of 20th October 2016, after the news on Deutschlandfunk, heard the contribution 'Premiere für Theresa May in Brüssel, For the first time — Premierministerin May beim EU-Gipfel in Brüssel' [Première for Theresa May in Brussels — for the First Time — Prime Minister May at the EU Summit in Brussels], a piece by the editor Friedbert Meurer. After "Brexit" Theresa May had become Prime Minister of the United Kingdom and people were asking whether she would be an "Iron Lady" in the mould of Margaret Thatcher. The commentator said: "Im Unterhaus, als sie schon Premierministerin war, wurde sie gefragt, ob sie bereit sei, den roten Knopf zu drücken, um die Atombombe zu zünden" [In the House of Commons, when she had already become Prime Minister, she was asked whether she would be prepared to press the red button in order to fire the atomic bomb]. Theresa May fired back her answer very quickly: **"Yes, and [...] and I have to say to you, gentlemen, that the whole point of deterrent is that our enemies need to know that we would be prepared to use it"**. That was translated as: "Ja, bei der Abschreckung geht es darum, dass unsere Feinde wissen müssen, dass wir bereit wären, unsere Nuklearwaffen zu benutzen". Theresa May's voice was still ringing in my ears and I thought we had put all that "behind" us once and for all. Did Theresa May leap right back into the era of the Cold War, when it was appropriate to say to the Soviet Union "that our enemies need to know that we would be prepared to use the atomic bombs that we possess"? Then my thoughts wandered and I remembered the line "When will they ever learn?" from the

song “Where Have All the Flowers Gone” that we used to sing back in the 1980s. Will you ever learn, Theresa? And so I also write this book for Theresa May.

Chapter 1: The Nuclear Battlefield

Berlin, 30th April 2014

Dear Herr Schubert,

I was very pleased to receive your letter at the beginning of the year and most grateful for your renewed offer to read through my notes. Unfortunately I am not in a position to send you a finished manuscript as I am still in the process of writing down some parts of my story. I am striving to produce a narrative which, while profoundly shaped by my personal experience in the years between 1980 and 1989, nevertheless constitutes more than a mere autobiography. As I have decided not to keep you waiting any longer, today I am sending you some of the “sections”. Please do not hesitate to comment or criticize.

While writing these notes I have repeatedly imagined sitting opposite you and conducting this conversation face-to-face. I hope you are not too astonished that I have needed someone to talk to! Please bear in mind that for someone who has interacted mainly with scientists for much of his life, conversation between people who hold differing opinions is part of the tradition of his discipline. May I count on your opening for me the “treasure chest” in which you store the wealth of experience you have acquired over the years in the political system of the Federal Republic?

So, I wish to discuss with you the political situation in the Federal Republic of Germany in the years between 1980 and 1989. Looking back on that period from the vantage point of 2014, I can still see the considerable danger posed at that time by the possibility of the “Cold War” turning into a “Hot War” with nuclear weapons, even though I did not feel it so strongly then. Is that because I was able successfully to suppress my fears? However, I also never ceased to place considerable trust in the “wisdom” of the governments of the leading “Great Powers”. With NATO’s Dual-Track decision (the strategic calculation behind which eludes me to this day) in 1979 this trust was damaged. Other physicists I know reacted in the same way. Initially those amongst them who felt they could demonstrate sufficient competence in their field of scientific expertise made some effort to advise and support the government. When the government gave increasing signs of resisting advice, a number of scientists started to oppose it on the question of nuclear weapons, an opposition that dealt a severe blow to the then-Federal Chancellor Helmut Schmidt (SPD). Contact with government representatives was repeatedly broken off.

Under Helmut Kohl (CDU) the situation did not improve. If you cast an eye over Document 10/2999 of the German Bundestag (I enclose a copy with this letter), you have before you a good example of how the Parliamentary Under-Secretary of State for the Ministry of Defence blocked every opportunity for discussion about a “quantitative security analysis of atomic weapons” by referring to national security. At the time a small group of scientists — including myself — really did suffer from the illusion that, by using the “request for a minor point of information” submitted by Member of Parliament Frau Kelly and the Green Fraction, we could win the ear of the Federal Chancellor Helmut Kohl and thereby inform the Federal German government of what was happening in the USA: namely, that there was some discussion in government circles as to whether or not the technical safety of nuclear weapons and their launch systems was guaranteed. At some point Helmut Kohl wrote in the press that the camel train would continue its journey even if the dogs were barking, thereby finding a beautifully appropriate image for a lack of action which he elevated to a state policy. Nevertheless, in 1989 he still possessed sufficient political savvy to slide off his camel when just enough time still remained for him to grab the coat tails of history!

At our last meeting you warned me not to rely exclusively on personal memories. You were right to do so. For a long time I had thought that during their meeting in Reykjavik on 12th October 1986 Mikhail Gorbachev and Ronald Reagan, the “Presidents” of the Great Powers, had concluded a treaty agreeing nuclear disarmament. My memory deceived me for — as I read in Mikhail Gorbachev’s autobiography, *Memoirs* — the two government leaders did not get along at all well in Reykjavik and no treaty was signed there. *Memoirs* records what actually happened in Reykjavik. When we last met I told you part of the story from memory. Today I type out what Gorbachev said in print:

We made our farewells and he left in his car. [...]

Only forty minutes remained until the press conference. Reagan had left for the American military base to take the aeroplane home. [...]

I walked from the building where the talks had been held. It was a distance of some 400 metres and I was feverishly collecting my thoughts. One thing preyed on my mind — had we not reached an agreement on both strategic and intermediate-range missiles, was it not an entirely new situation, and should it be sacrificed for the sake of a momentary propaganda advantage? My intuition was telling me that I should cool off and think it all over thoroughly. I had not yet made up my mind when I suddenly found myself in the enormous press-

conference room. About a thousand journalists were waiting for us. When I came into the room the merciless, often cynical and cheeky journalists stood up in silence. I sensed anxiety in the air. I suddenly felt emotional, even shaken. These people standing in front of me seemed to represent mankind waiting for its fate to be decided.

At this moment I realized the true meaning of Reykjavik and knew what further course we had to follow.

My speech has been published in newspapers and commented on by scores of journalists, political scientists and politicians. I therefore do not quote it *in extenso*. The key phrase of the speech was: ‘In spite of all its drama, Reykjavik is not a failure — it is a breakthrough, which allowed us for the first time to look over the horizon.’ The audience came out of its state of shock, greeting the sentence with thunderous applause. One journalist wrote later in an article characterizing the mood of the press conference: ‘When the General Secretary presented the failure of the Reykjavik meeting as a victory, Raisa Gorbachev was sitting in the conference hall, looking with awe at her husband, with tears rolling down her face.’⁶

Gorbachev then writes that on 8th December 1987 a “Soviet-American Treaty on the complete abolition of land-based medium-range nuclear weapons” was signed and claims that it was “the first treaty agreeing the destruction of a whole type of nuclear weapon”.⁷

Is it possible to assert that this pact was the first step on the road to the events that took place in November 1989? In my opinion, without the Intermediate-Range Nuclear Forces Treaty nothing would have happened to bring about a reduction in the large number of nuclear weapons which had been installed in Germany on the border between the two military blocks. It is precisely these nuclear weapons that, in the years 1982 to 1989, became a cause for very serious concern on my part.

The present day finds me still pondering over what persuaded Reagan to reconsider his dismissive attitude towards Gorbachev and place enough trust in the Soviet Union to conclude a disarmament treaty. In 1982 and 1983, when Reagan was already President of the United States, I was spending some time in Berkeley, California, where I was doing research. It was my experience at the time that the residents of the area around San Francisco harboured deep-

⁶ Mikhail Gorbachev, *Memoirs* (London etc.: Doubleday, 1996), p. 419.

⁷ Translation of the passage in the German version of the book, p. 413. (The English version differs somewhat.) Reference is made to the treaty on pp. 442–46 of the English version.

seated reservations about their President. For example, at crossroads in Berkeley it was virtually impossible to find a traffic-priority sign which did not have stuck on it a label bearing the name “Reagan”. The exhortation “Stop Reagan!” on a red background! When I asked what it meant, I was reminded that when Governor of California Reagan had once mobilized the National Guard against students. The result had been a number of student deaths. For that reason, too, “Stop Reagan!”. Other reports also led me to the conclusion that Reagan was an incorrigible “hawk” who could be persuaded by neither political nor scientific arguments to think about disarmament.

It is true that when I flew to San Francisco in February 1982 I had expected to arrive in a peaceful land in which issues relating to nuclear armament were not discussed. These expectations soon turned out to be wrong. Right at the beginning of my almost two-year stay in Berkeley I noticed the following sentence on a campus bus stop: “Ah, you are living on a nuclear battlefield over there!”. I felt as if I had been hit by a bullet. It was not the fact that, in the case of military conflict between NATO and the Warsaw Pact, Germany could become a nuclear battlefield which was shocking: this had become clear to me in 1982! Rather, what shocked me was the assumption expressed by that casual sentence: namely, that a conflict involving nuclear weapons could be contained within Germany. Had this view become so commonplace that it had been aired during a brief conversation between complete strangers at a bus stop in sunny California? Usually such conversations were quite superficial, something along the lines of:

- | | |
|--------------------------------|-------------------------------|
| A. “How are you doing?” | B. “Excellent! Feeling fine!” |
| A. “Where are you from?” | B. “Berlin, Germany.” |
| A. “Really? You are kidding?!” | |

It could have been as early as February 1982 that a leaflet on a notice board attracted my attention. The flyer was put out by a group calling themselves the “Hill Employees for the Nuclear Weapons Freeze”. The group were active at the Lawrence Berkeley Laboratory, which had its home in the hills above the campus of the University of California at Berkeley. I was a guest at this laboratory and was carrying out research at one of the particle accelerators. On the instructions of the President of the University it was not permitted to include the name of the laboratory in the name of the group, but everyone in Berkeley knew where the Hill Employees came from. Through the leaflet the group invited colleagues interested in a “freeze on the stock of nuclear weapons” to attend a meeting in the downstairs room of the cafeteria during lunchtime on Wednesdays. I went and met six or seven people

who had taken a seat on one side of a large table. The group sitting there seemed rather small to me. I sat down at the other end of the table and started eating while I listened. They were debating in what ways it might be possible to support “Proposition 12”, the “Bilateral Nuclear Weapons Freeze Initiative”, a suggestion for freezing the arsenal of nuclear weapons. I had never heard of such a suggestion before. The debate focussed on how the majority of Californian citizens could be persuaded to vote in the elections of November 1982 for an initiative which committed the Governor of California to writing a letter to the President of the United States demanding that the President, Ronald Reagan, enter negotiations with the government of the Soviet Union, the aim being a “verifiable” stop to nuclear armament. I soon learned that at state level in California laws would have to be altered if the initiative were accepted by a vote. However, the affairs of the whole Union were removed from direct influence through an initiative on the part of one of the states. The President of the United States could read the letter, ignore it or file it. However, Ronald Reagan could also listen to the citizens of his home state of California. It was by this very thin thread that hung the hopes for disarmament cherished by the Hill Employees for the Nuclear Weapons Freeze!

When I had just about finished munching my last lettuce leaf, one of the Hill Employees present at the meeting looked at me and asked me who I was and what had induced me to appear in the downstairs room of the cafeteria. I referred to the leaflet I had seen on the notice board and introduced myself as a researcher at the Lawrence Berkeley Laboratory who had just arrived from Berlin in Germany. Now six or seven pairs of eyes were turned in my direction and I was asked to explain why the big demonstration against nuclear weapons had recently taken place in Bonn. They were obviously referring to the “demonstration for peace” in the Hofgarten (palace gardens) at Bonn University on 10th October 1981. Somehow they had found out about it, even though American papers rarely reported on events in Europe. I had been present in Bonn and, pushing my way through the crowds with considerable difficulty, had reached the Hofgarten after Erhard Eppler, whom I had set my heart on hearing, had already finished his speech. The then-Chancellor of the Federal Republic, Helmut Schmidt (SDP), to whom the demonstrators were addressing their appeal, had ignored everything — but here, on the other side of the world, there were a few people who had turned their ears towards Bonn! At first I was speechless since I had not expected questions of this sort in this of all places. I was not equipped to give a properly informed answer as I had not brought with me a single sheet of paper with information on the discussion about nuclear weapons that was going on in Germany at the time.

When I had found my tongue, I gave an impromptu explanation: as they knew, the Russians had nuclear weapons directed at targets in America; the Americans had programmed into their rockets targets in the Soviet Union. In Germany the danger of dying due to Russian atomic weapons was accompanied by the threat posed by American atomic weapons. Places in Germany were doubly endangered. The Hill Employees present at the meeting expressed understanding for the unease felt by the German population in the face of this situation and said they were ready to do something. They gave me a week in which to prepare a short, informal lecture which contained more information.

For me it was a real stroke of luck that shortly afterwards someone pointed me in the direction of a small tobacco shop in Berkeley. Apparently this shop was the only place for miles around where I could buy German newspapers. I found the shop in a street that ran parallel to Telegraph Avenue, in the neighbourhood that since 1968 had been the preferred meeting place for people who were disquieted and wanted to speak and discuss issues openly. Close to the shop was the Mediterranean Cafe where years later —and I suspect to this day — you could meet aging “sixty-eighters”. I found the tobacco shop and close to the shop entrance came across customers who were talking to the shop-owner. In the back of the long, narrow room there was nobody, just an impressive heap of old editions of the German news magazine *Der Spiegel*. Just a single copy of the current edition was on sale, stuck on a shelf alongside other newspapers. Obviously only one copy of *Der Spiegel* was delivered to the shop every week; and since the shop-owner apparently had no interest whatsoever in selling this copy and since unsold copies of *Der Spiegel* could not be returned to the publisher, with time this handsome heap of old newspapers had been accumulated. I was able to poke around in it undisturbed to my heart’s content.

A copy of *Der Spiegel* fell into my hands which contained a report about a programme recently broadcast by the TV channel CBS (Columbia Broadcasting System). A multi-part series dealing with the defence of the USA had been aired under the heading “The Defence of the United States”. Part 2 of the series was entitled “The Nuclear Battlefield” and was devoted to the possibility of a military conflict played out on German soil and deploying nuclear weapons. One scene in the film showed a member of the American military standing in front of a sand pit modelled on the topography of Hesse and Thuringia. In plain terms he explained to viewers how the West would react if the superior Russian tank divisions were to attack from Thuringia in an advance on Frankfurt am Main. The border between the military power-blocs, which followed the old state boundary between Hesse and Thuringia, gave the

town of Eisenach a wide berth, with the result that on the eastern side there was a bridgehead that stretched far into the west and from which the road to the Rhine was worryingly short. In military language this terrain was known as the “Thuringian Balcony”. From Thuringia there extended the densely forested German Central Uplands (*Mittelgebirge*), which presented some sort of barrier to motorized troops. However, there was a gap in the Uplands, the “Fulda Gap”, through which tank units could easily advance. This, the “Fulda Gap”, was the most vulnerable spot in NATO’s line of defence and NATO troops were ready to strike with a massive deployment of nuclear weapons should they run into difficulties when mounting a defence using conventional weapons. In those years copies of an American “Field Manual” circulated amongst German opponents to nuclear weapons. According to this Manual 191 atomic bombs of varying strengths were very quickly to be fired in the area between Bad Hersfeld and Schweinfurt. An old trade route led through the “Fulda Gap” along which Roman troops had already marched on their way into the interior of Germania. Germanic warriors had advanced in the opposite direction when they had attacked Roman settlements in the Wetterau (an area to the north of Frankfurt am Main). This is the spot where American units must have pushed through when they advanced far into Thuringia during the Second World War. I remember a photo from those days that showed a long line of German prisoners-of-war marching south on a road near Gießen, obviously in the direction of Frankfurt am Main. On current German maps blue lines represent autobahns. An autobahn coming from the north divides at the Hattenberger Dreieck (a major motorway junction near Bad Hersfeld). One branch goes south-east in the direction of Würzburg; whilst the other branch, which leads in a more westerly direction, brings you to Gießen and Frankfurt am Main.

The people from CBS had travelled to Hesse and filmed the landscape of the Hessian Central Uplands and Hessian timber-frame houses. In Hattenbach a Protestant pastor dressed in his robes stood in front of the village church surrounded by his confirmands and looked into the camera in a friendly fashion. In the imagination of many Americans these were precisely the images they associated with Germany. When this second episode in the series about the defence of the USA was broadcast, some Americans recognized the places from which their forbears had emigrated or which they had visited when stationed with the army in Hesse. Some of those who had connexions to Hattenbach wrote letters with the following content: “Hey! We have seen a film about you on TV! You are living precisely on Ground Zero!”. Many residents took fright and panicked when they discovered what “Ground Zero” was; others wanted to hold onto the friendship with America whatever the circumstances, even if a

nuclear weapon from the NATO arsenal were to reduce their homeland to rubble, dust and ashes. *Der Spiegel* contained an extensive report about the division of the village residents into two mutually hostile factions. There it was again, the old song of disharmony which always rings out from German lands whenever resistance to authority is the order of the day.

The story of Hattenbach was just what I needed for the draft of my lecture to the Hill Employees. In my first lecture to a purely American public I wanted to follow the suggestion of Professor Wazlawik, an Austrian psychologist who taught and researched at the University of Palo Alto in California. He recommended inserting a story about the fate of “little” people at an appropriate point in a lecture. I had read, and been amused by, this author’s book when preparing for my stay in America and had made a particular note of the fact that the customary German style of lecturing — the “now-I-am-going-to-teach-you-something” style — was inappropriate for America. What other material had I been able to collect for the lecture that could enhance its value as an instructive experience? There were, inevitably, those depressing items about military strategies and the effect that nuclear weapons would have in the “European Theatre of War”. I was really relieved when my lecture was well received in the session with the Hill Employees. One member of the group even suggested that I should give the same talk before a larger public in a larger lecture theatre as part of their series of films and lectures. This suggestion met with agreement from the others who were present, I was “nailed down” straightaway and a day later was surprised at how little time I had needed to be accepted into a group in Berkeley that campaigned for nuclear disarmament!

The Hill Employees had already started their film and lecture series at the Lawrence Berkeley Laboratory when I joined them. They had formed themselves into a group in order to encourage discussion in the Laboratory about the arms race and to organize support for the initiative aimed at a freeze on the arsenal of nuclear weapons (“Nuclear Weapons Freeze Proposition”). In all their activities they adhered strictly to the guidelines laid down in the official eight-page booklet *Policy and Procedure*. The President of the University of California, within whose administrative remit the Lawrence Berkeley Laboratory also lay, had given employees of University institutes the right to organize unofficial events in Laboratory rooms during the lunch break between twelve and one o’clock, provided they behaved “in an orderly fashion”. They were permitted to use technical equipment such as microphones and projectors free of charge if six people took responsibility and pledged to take over the cost of repair should any of the equipment be damaged.

It was within the framework of these regulations that my lecture took place on Thursday 29th July 1982 in the large auditorium in Building 50. The title of the lecture — which was given in English — was “A German Perspective on Nuclear Weapons”. The word “perspective” is also used in German and alludes to the method of painting discovered in the Renaissance which enables the impression of a three-dimensional space to be conjured up in a two-dimensional picture. Depending on the personal viewpoint of the painter, this perspectival image can vary considerably. I had already found my viewpoint and worked on improving the text of the lecture while the members of the group focussed on the organization of the whole event. They had posters printed on yellow paper advertising the lecture; and introduced me as a guest-scientist from West Berlin who was going to tell the story of the little German village of Hattenbach, identified by U. S. Military strategists as “Site Ground Zero”. The speaker was also going to say something about the European movement against nuclear weapons. During the lecture a map of Hesse was projected onto the screen. I pointed to Hattenbach and to the course of the former “demarcation line” along the border, as well as to the “Thuringian Balcony”, the town of Fulda and the “Fulda Gap”. In as undramatic a way as possible I sought to talk about the nuclear battlefield in the “European Theatre” and the danger of a war with nuclear weapons in Europe. However, in the course of the lecture I noticed that — against my will — my voice betrayed the emotions that seized hold of me while I repeated the lecture I had previously given to the small circle of the Hill Employees. In later years and different surroundings I also failed to play the rational scientist who can talk about an atomic war without betraying his emotions. In the time remaining after the lecture the Hill Employees had the chance to expound upon their concerns and their position.

Many years later, in 2010, almost a year after my age-related retirement from the research centre in Berlin, I was clearing out my office. I found a file with the inscription “Hill Employees” that had stood neglected in my bookcase for many years. The file contained the papers that I had collected about the activities of this group, a member of which I had become through giving the lecture. Amongst them were leaflets inviting people to film-showings and lectures by some very prominent people and they reminded me that the campaign by the Hill Employees in Berkeley to win votes in favour of a freeze on the arsenal of nuclear weapons had continued for months after my lecture. Money was collected to pay for an advertisement in the *San Francisco Chronicle*. Soon a small library was created in which were deposited articles, books and documents about the problem of nuclear weapons. The library saw a great deal of use by people wanting to inform themselves further. I shall discuss these things in a different essay. All these initiatives were undertaken in order to gain the support of

Californian voters for a proposition that basically amounted to prevailing upon the Governor of California to write a letter to the President of the United States urging the latter to embark upon negotiations to limit the arsenal of atomic weapons. Was it worth the effort? Very possibly the letter was not even read by the President! In the ballot on 2nd November 1982 “Proposition 12” received a majority of the votes and the letter was indeed written to President Ronald Reagan! I have never heard of Ronald Reagan showing any reaction to this letter. Had everything undertaken by the Hill Employees truly led to nothing more than a couple of lines on a sheet of paper? I felt very small.

In the same file I also found a sheet of paper with the signatures of eighteen Hill Employees. In well-chosen words they thanked me for speaking to an audience of employees from the Lawrence Berkeley Laboratory and for making, through my lecture, a “significant contribution to the film and speaker series” which had been “planned to encourage discussion on the arms race and nuclear weapons policies”. My “personal style of presentation” was praised as being “very effective” in achieving the aim of “providing the audience with a view of how the arms race between the United States and the Soviet Union [was] perceived by Europeans”. The people thanking me — amongst them, to my huge delight, the Nobel Prize winner Owen Chamberlain — placed immense value on my readiness to address these important topics for discussion. When I held the letter in my hands once again, it went through my head that this was very agreeable praise for a very small matter, one which had lasted somewhat less than an hour; and that many other, much more onerous things that I had done in the course of my professional life had gone completely unappreciated. Had the lecture carried more weight than I had credited it with?

I have a dream. I hold the letter of thanks in my hands and enter a room in which a tribunal waits for me. The highest judge, falcon-headed Horus, sits in his chair and supervises the procedure of weighing. In the middle of the room scales have been set up that are larger than a man. The beam of the scales tilts to the right, where sits Maat, Goddess of Justice and Truth. Jackal-headed Anubis approaches me and asks: “What do we have here?”. I pass him the letter of thanks and he places it into the left-hand dish of the scales. Slowly the beam assumes a horizontal position and remains there. Ibis-beaked Thot, the guider of souls, reads the scales and says: “That’s right! An admission in the negative!”. He puts down his writing materials and I look at him with a question on my face. He says: “No doom-laden warning written on the wall again!”. As I still look puzzled he says: “Yes. This will interest you:

Gorbachev was here and brought the tears shed by his wife Raisa in Reykjavik. They carried some weight as well!”⁸

How are things to continue? From the allusions and intimations in the text before you, you may conclude that much still remains to be recorded. In my next letters I would like to elaborate on the situation in America. At the time my American colleagues were less worried about the “Fulda Gap” than about the possibility of nuclear weapons exploding in their native country. When I returned to Germany in 1983, a group of scientists in Berlin picked up on the concerns expressed by American experts about the technical safety of nuclear weapons and formulated an enquiry addressed to the Federal Government. In their answer the Federal Government invoked their inability to provide information about problems linked to nuclear weapons as such matters were classified as “secret”. That is something else I would like to talk about!

Best wishes,

W. Z.

⁸ The dream is based on the picture *The Weighing of Souls*, which I found in *Geheimnisvolles Ägypten*, ed. by Christian Delacampagne and Erich Lessing (Elftville: Bechtermünz, 1991), p. 100.

Chapter 2: The Danger of War with Nuclear Weapons

Berlin, 3rd May 2014

Dear Ulrich,

In order to answer your question, I shall have to write a long letter. You asked me about the things I experienced during my stay in the United States in 1982 and 1983. And you talked about the heated discussions concerning nuclear weapons that were taking place in Germany at the same time as I was in Berkeley, California; and so you wanted to know what people on the other side of the Atlantic thought about the problems posed by nuclear weapons. So, I have dug deep into my memory, with the result that a jumbled pile of memories now lie heaped up before me. The most vivid, most colourful amongst them relate to California. I remember that at the time a lot of people I met while travelling thought I was one of those “freaky flower-power kids” when I told them I came from the San Francisco area. If you saw photos of me from that time, you really could think I was part of the scene. True, when I went walking through the neighbourhood of Haight-Ashbury in San Francisco the flower children had already left it, but their traces were still immediately visible everywhere. With good spirits but without flowers in my hair I followed their tracks, met numerous friendly people with whom I am still in touch today and was blown away by the breath-taking beauty of the North Californian landscape. That is one aspect of my impressions of the United States.

In this letter I shall focus on the movement to freeze nuclear weapons. The “Freeze” movement attempted to persuade the American government to conclude a treaty with the Soviet Union to limit the arsenal of nuclear weapons. Before my arrival in Berkeley this movement had spread across the whole of the United States and in 1982 became, thanks not least to the initiatives of Senators Mark O. Hatfield and Edward M. Kennedy, a political force that encompassed politicians as well. The two senators published a paperback entitled *Freeze! How You Can Help Prevent Nuclear War*.⁹ The book lists many well-known personalities, politicians and actively engaged groups who supported these initiatives. The movement also had education as its goal: it wanted to inform the residents of the United States about the consequences of a war with nuclear weapons. This was the time when American citizens learnt that those golden days had passed when they had been able to observe, from the safe distance of their home, the battles going on in the world’s “theatres of

⁹ Toronto: Bantam Books, 1982.

war” (for example, the “European theatre of war”). In 1982 they were directly threatened by the Soviet Union’s intercontinental rockets. There was an additional cause for concern: one of America’s “own” nuclear weapons might accidentally be thrown off course by a technical error in its security system and explode anywhere in the world, including the United States themselves. For example, a single bomb with an explosive force of a megaton of TNT could destroy large parts of San Francisco and its surroundings. The process of learning undergone by the Americans was nothing if not painful, for they had not experienced the cataclysmic wars that we had in Europe. In addition, I observed growing unrest about the government and its administration because more and more American citizens entertained doubts as to whether decisions about the arming of their troops with nuclear weapons were being taken with any expert knowledge and with sufficient seriousness.

Before I start my report on the problems related to nuclear weapons, I would like to make one more preliminary remark: I was in Berkeley “on business”. I spent by far the greatest part of my working life there on research and the issue of nuclear weapons played a subordinate role. I was working on the apparatuses connected to the large machines and thoroughly enjoyed the privilege of working in an area of physics that was very generously funded. For us physicists at the Hahn-Meitner Institute (HMI) in Berlin, the Lawrence Berkeley Laboratory (LBL) was *the* preferred place to spend our sabbatical leave. Alluding to the Sabbath, God’s day of rest after six strenuous days creating the Universe, we use the word “sabbatical” for a period spent conducting research at a research institute with which we have friendly ties — though we only do so, of course, after a number of years working hard “at home”. In Berkeley Ernest Lawrence had invented the ring accelerator, the cyclotron; and we had adopted the way it functioned for the newly constructed split-pole cyclotron in Berlin. Several ring accelerators had been operating in Berkeley for some years and the Laboratory had enjoyed considerable success in nuclear physics. For nuclear physicists it had become one of the foremost institutions in the world. Today, in 2014, you simply cannot imagine just how abundant was the cornucopia that poured its treasures over nuclear physics! In my view, this generosity was a result of the programme “Atoms for Peace” launched under the American President Eisenhower. With this programme the American government offered countries that renounced the development and construction of nuclear weapons support in projects aimed at the “civilian use of nuclear physics”. It was hoped the proliferation of atomic weapons might be prevented in this way.

When I went to the United States the enthusiasm for science and technology was still largely undimmed in that country. You have to know that the American public had celebrated, with enthusiasm, the “invention of the atom bomb” in 1945; and that from then until the early 1980s only very few voices indeed were raised in criticism of technical “achievements” of this kind. One striking example of American enthusiasm for science and also for nuclear physics can be seen in the Lawrence Hall of Science, built in memory of Ernest Lawrence on the slopes above the research laboratory in Berkeley. Instead of a statue stands a building intended to make learning about science fun for the visitor, including school classes. A visit to the Museum of Science really can leave you feeling that technology has mankind’s best interests at heart. The natural world all around you, by contrast, may well be threatening! Not that this is stated directly in the Lawrence Hall of Science. However, the great San Francisco earthquake that shook the city at 4.48 on the morning of 18th April 1906 was firmly anchored in collective memory, so this perception took hold of you almost of its own accord. Almost eighty years later, in 1981, a book about the earthquake records that the energy it released, which acted on all the layers of rock, was as great as that of “twelve thousand bombs of the type dropped on Hiroshima”.¹⁰ The photo on the book’s dust jacket depicts a bird’s eye view of the devastated city, in which only the odd stone house has remained standing. The book also states that a further sizable earthquake along the San Andreas Fault in California could be expected in the near future. Would San Francisco be hit again? There were also other fault lines: for example, the Hayward Fault, which ran right through the middle of Berkeley. During “Earthquake Awareness Week” the fault was marked by means of red sticky tape and everyone could see that the football stadium had been built precisely along the course of the fault line. During this week, which was intended to raise awareness of just how possible an earthquake was, people were meant to check whether their wooden houses really were firmly screwed onto their foundations. Films were shown and pictures projected onto screens in order to illustrate what enormous destruction could be inflicted by these natural forces. Who can be surprised, then, if the Californians considered natural forces to be much more threatening than an atom bomb?

In the film *The Last Epidemic*, which also circulated in Germany under the title *Die Letzte Epidemie*, a coalition of doctors called “Physicians for Social Responsibility” tried to counteract the view that experience gathered in dealing with natural catastrophes and previous wars permitted the conclusion that society could survive the catastrophe of an unlimited war

¹⁰ Eric Saul and Don DeNevi, *The Great San Francisco Earthquake and Fire, 1906* (Millbrae, California: Celestial Arts, 1981).

fought with nuclear weapons. It is true that the violent earthquake in San Francisco and the subsequent fire were survived by many residents and that some buildings in the city remained undamaged. In the book about the great earthquake it mentions *en passant* that the energy released by the earthquake was equivalent to that of “twelve thousand bombs of the type dropped on Hiroshima” or “6 mega-tons of TNT”. These statements cannot both be true at the same time, because if I assume that the explosive force of the Hiroshima bomb was equivalent to twelve to fifteen kilo-tons of TNT, I reach a much larger number than six mega-tons for twelve-thousand Hiroshima bombs. There could, therefore, be a mistake in the calculations. The film *The Last Epidemic* explains that over one hundred per cent of the population of San Francisco would be killed by dropping two bombs with an explosive force of a mega-ton each. If I assume that atomic bombs with a sum total of six mega-tons were dropped, then the population of San Francisco and the surrounding areas would be killed three times over. That is the “overkill” which no earthquake could possibly achieve!

How shall I proceed with my description of impressions from the past? I think I shall do what a goldsmith does when he lays out in front of him a row of the pearls he has already polished and those he is still working on and for the moment does not waste any time thinking about how he will string them together. The “pearl” I wish to report upon now are the “independently sponsored” group of employees at the Lawrence Berkeley Laboratory who called themselves the Hill Employees for the Nuclear Weapons Freeze. In the years 1981 and 1982 this group organized a series of films and lectures aimed at supporting the Kennedy-Hatfield Congressional Nuclear Freeze Resolution (the political arm of the book *Freeze! How You Can Help Prevent Nuclear War* by Senators Edward M. Kennedy and Mark O. Hatfield) and, at the same time, stimulating debate amongst the employees at the Laboratory about the problems associated with nuclear weapons. As part of this series I gave a lecture on the “European Perspective on Nuclear Weapons”. I also listened very attentively to the lectures given by in some cases very prominent speakers and followed up the tips on important relevant books and articles passed on to me by members of the group. These were my main sources of knowledge about the American perspective on nuclear weapons and the problems associated with them. At first I was very surprised that all this information was freely accessible. It even included papers which I had previously thought must be classified. In one case known to me the **D**epartment **o**f **E**nergy (DOE) of the United States had officially published a compendious volume, Glasstone and Dolan’s *The Effects of Nuclear Weapons*.¹¹ I

¹¹ Samuel Glasstone and Philip J. Dolan (eds), *The Effects of Nuclear Weapons* (Washington: U. S. Government Printing Office, 1977).

was surprised by this at the beginning of my stay in America because I knew that the American occupation forces in Japan had declared classified everything to do with the effects of the atomic bombs that had been dropped. However, with time I came to view the free exchange of information and ideas as the expression of a living democracy.

Recently I came across Roger Molander's article "The greening of a nuclear strategist" amongst the documents I had brought back with me from Berkeley. It had appeared in the newspaper *Tribune/Today* on 28th March 1982. The "greening" of the title means to "become or make green" and is a reference to the Green Party in Germany. In the article Roger Molander describes how, in the course of his activities as advisor to the American government on strategic issues concerning the deployment of nuclear weapons, his position slid along the scale to coincide with that occupied by the Greens. A copy of the article was given to me by a member of the "Hill Employees", who explained that it would provide me with answers to questions I had already asked and to those I had yet to pose. And that is exactly what happened: Roger Molander's article frequently delivered the first answer to a new question. In this letter I shall base myself on Molander's article. To give you a first impression, I shall include the first paragraph of the article:

I WAS INTRODUCED to nuclear war in the mid-1950s, hiding under my school desk during civil defense drills, hoping the Russian bombers would never come. It never crossed my mind then that I would someday be working on nuclear strategy at the White House, hoping still that nuclear war would never come — and realizing how easily it might.

In many of my conversations with the members of the Hill Employees we talked about similar experiences from our school days. My American partners in this dialogue confirmed that they, too, had crawled under their school desks whenever they had practised how to protect themselves in the case of an attack with atomic weapons. They, too, had hoped that it would never come to a nuclear war and it was this hope that motivated their current activities. I was asked about my experience at school. In the 1950s I attended the primary school in Hermannsburg, a village on the Lüneburg Heath. The Second World War had only ended a few years previously with the defeat of the German Reich. The "English", the local army of occupation, were rarely to be seen on the streets; just once a week military transport lorries drove through the village when underwater mines were transported to Tiefental. The muffled grumbling sounds of the mines being exploded penetrated our village from there. The village had survived the War undamaged and the town of Celle, the region's administrative centre, had also lost none of its timber-framed buildings and presented the perfect picture of an

idyllic world. We were taught by teachers who had survived the bloody battles of the War. They told us about their experiences, which turned into adventure stories in the telling. Our great hero was a captain who had infiltrated the English naval base at Scapa Flow with his submarine and sunk several warships with torpedoes. The music teacher was able to tell us about the ceremony surrounding the burial of a fallen soldier and, choked with emotion, we sang the song *Ich hatte einen Kameraden* [*Once I Had a Comrade*]. When I sang the words “Eine Kugel kam geflogen, galt sie ihm oder galt sie mir? Ihn hat es hinweg gerissen, er lag zu meinen Füßen” [A bullet came flying through the air. Was it meant for him or me? It tore him away and felled him at my feet], I was too young to realize that a soldier needs a great deal of luck to survive a war. We also learnt how to protect ourselves. You had to lie down on the ground as flat as possible when bullets flew through the air; and in case of attack with an atomic bomb your head was protected by putting your briefcase over it. I heard that without becoming a pacifist, but my enthusiasm for the adventure of war was dispelled within a minute. One of our teachers had served on a submarine. He did not want to tell us about the War and only said: “I hope for your sakes that you never have to experience anything like it”. We pestered him and in the end he did tell us something: the story of a young mate who had worn a wedding ring on his finger. He had just got married. One day, when the submarine had to dive quickly, he caught his ring on a hook; and as there was no time to free the ring from the hook the young mate simply had his ring finger torn off.

At the end of the article Roger Molander describes how he came to hand in his resignation:

It happened at a meeting in the Pentagon [i.e. the American Department of Defense] when a Navy captain mused on the state of the world and offered the view that people in this country [i.e. the United States] and Europe were getting much too excited about the consequences of nuclear war. He argued that people were “talking as if nuclear war would be the end of the world when, in fact, only 500 million people would be killed.”

Then he went on to argue that within a generation, genetic engineering would make people immune to radiation. I reached for my hat, suddenly knowing how Woody Allen felt in “Annie Hall” when he excused himself from a conversation with her brother with the plea that he had “an appointment back on planet Earth.”

When, today, I read those words written thirty years ago I feel rising in me the fear that some like-minded naval captain could trigger a nuclear war. Roger Molander’s report on his experiences scared many people to the very core of their being. They had never expected that anyone with the views expressed above might exercise influence on military planning. My friends amongst the Hill Employees dismissed these notions as those of a maniac, adding that

a manic madman was the last person they wanted on the strategic planning staff of the American Department of Defense. A few times after that I again witnessed people being characterized as maniacs who either overestimated their strength and intellectual abilities or who believed it was possible to limit the effects of a nuclear war to a certain region so that the United States would suffer no harm. Looking back on the most recent past, I have been struck by the fact that the United States of America have indeed been very successful at conducting “their wars” outside their own territory. I had been convinced that a war of these proportions would also affect the United States. The “maniac” was reckoning with five hundred million dead in a nuclear war. That would be the largest number of people ever to be killed in a war, ten times as many as in the Second World War! Was this Navy captain planning to annihilate the entire population of Germany and of eight other similar-sized countries? The small village of Hermannsburg on the Lüneburg Heath, which had survived two world wars without damage, would not survive the third. The teachers would be dead, too. I got my teeth into the number five hundred million, asking the following questions: had the maniac added together the 268 million residents of the United States and the 288.6 million of the Soviet Union (population statistics from *Enzyklopädie Brockhaus*)¹² and reached the number of five million war dead that way? If you thought about a mutual strike using ballistic missiles this figure could represent a realistic description of the course of war! Or did the military strategists think that the death of a tenth of the world’s population was always acceptable? Was it traditional to reckon with losses of ten per cent of the “human material” in war? I thought of Robert Smith, who had let the house in Berkeley to me and who, as a young man in England, had encountered those ten per cent. Robert had told me how, in 1944, as he had been standing in the serried ranks waiting to be transported across the Channel, he had looked first at the five comrades to his left and then at the five to his right when the colonel addressing the troops had announced that one out of every ten would be wounded or killed. As a medic in the theatres of war in Normandy, Sedan and Belgium Robert Smith could not get these words out of his head. When he was wounded at Wallendorf in Germany, he thought to himself: “So, you were one of them after all”.

In many respects the article by Roger Molander was the key to my understanding why a strong protest movement against the further stockpiling of nuclear weapons emerged in the United States in the 1980s. Roger Molander, who had been an advisor on strategic defence matters to the American President, had set himself the goal of enlightening the population of America about the writing on their wall. From some of his remarks I deduced that the risk of

¹² Leipzig 1998.

a war with nuclear weapons was unacceptably high. When he comes to how he felt after the failure of the negotiations on the SALT II disarmament treaty, Molander writes that he had some time to reflect on how they (the protagonists on the American side) had managed to get themselves into the terrible mess that prevailed at that point.

He remarks: “The factor that stood out in my mind was the seeming lack of understanding of just how great the chance of nuclear war really was”. In my opinion Roger Molander — or any other serious advisor — could write exactly the same thing today, in 2014, if he were in the service of the government. Roger Molander emphasized the finding that not even the American president’s military strategists or colleagues had the faintest idea of what would be in store for national populations in the case of nuclear war. For this reason he became president of the group called Ground Zero which published the book *Nuclear War: What's in it for you?*.¹³ Together with the “Freeze” movement he had set himself the task of enlightening the clueless population of the United States of America. Looking back from the vantage point of 2014 it is remarkable that the “whistle blower” Roger Molander was not persecuted by the American government.

None of the doctors who had brought out the film *The Last Epidemic* was prosecuted by the American government either. While I had seen this film in the United States, it was only after I had returned to Germany that I noticed just how explosive these statements were. In the Pädagogische Hochschule [teacher-training college] in Berlin-Lankwitz someone was selling the German version; I have forgotten the translator’s name. At the time I was given a typescript text in German, to which I refer in writing this letter. When I promised you I would write about that time thirty years ago I did not for a moment think that revisiting and processing these events would make me so furious. There are things I simply failed to notice on first reading; or else little everyday matters distracted me from being seized by terror and horror in the face of the policies being pursued with atomic weapons.

In *The Last Epidemic*, Gene La Rocque, Rear Admiral A. D. in the American Navy, is given the opportunity to speak. He says:

My life has been spent in planning for both conventional and nuclear war. While the governments of the United States, France, Great Britain, Soviet Union, China are today planning, training and equipping their forces for nuclear war. [...] One of the reasons this arms race keeps going is that military men honestly think they could win a war, a nuclear war, any kind of war and we have to think that way, that’s our business, and [...] so we

¹³ New York: Pocket Books, 1982 (German: *Kernwaffenkrieg: Was ist für Dich da drin?*).

are constantly asking for more powerful, more accurate, more destructive weapons that can be fired more rapidly so that we can get the jump on the other fella and win the war.

At another point in the film Gene La Rocque says:

And most people I talk with in the United States say: ‘Oh, the United States never use nuclear weapons first’. But, the fact is that it is our oft-stated policy by the Secretary for Defense and the President that we would not hesitate to use nuclear weapons first if the situation requires it and that’s worldwide.

Thus the film is underpinned by the theses presented by Roger Molander. As residents of the Federal Republic of Germany we must listen most attentively, for La Rocque’s last remark refers to our native land, on the soil of which numerous nuclear weapons belonging to the USA were stationed. And how do things stand today? Who controls the atom bombs which are still present in Germany and whose property are they? And how independent are the military when it comes to deciding whether or not to deploy nuclear weapons when, in their opinion, “the situation requires it”?

Roger Molander describes how the birth of his second child in February 1980 prompted him to re-evaluate his activity as advisor to the American government: “Now there she was, a new person, a new being, demanding the right to live, to find out ‘why she came’. And here I was, thinking of the risks of nuclear war”. Molander was stuck by the “absurdity of the situation we Americans found ourselves in — living in an imperfect world with imperfect machines and imperfect people making decisions on subjects they only partially understood”. He saw that the general public barely had any information with which to form a substantial opinion on American policy regarding nuclear weapons. On the other hand, the opinion polls were cobbled together so simply that they could not assist the government in developing a responsible policy. Roger Molander continues:

A larger part of the problem, however, is that no effort has been made by the government to maintain public concern and understanding about the fundamental problems of nuclear war. Perhaps this is understandable. What president is going to send a message to the nation that he and his colleagues in Washington are losing their grip on the nuclear war issue?

It seems to me the last sentence could explain why the German government barricaded itself behind the duty to maintain confidentiality when Petra Kelly from the Green Party submitted a request for a minor point of information. I shall return to this in a different context.

In a different section of his article Molander provides us with an insight into the way in which some strategists made decisions about the planning and deployment of atomic weapons. He wrote that a number of people on the strategic planning staff were obviously completely lacking in any understanding of just how great the likelihood of a war with nuclear weapons was. Moreover, the behaviour of the advisors had, at times, been inappropriate. He reports “temper tantrums”:¹⁴

The last place I expected to find adults losing control of themselves was in the White House rooms with nuclear war planners. But there the tantrums were — directed at officials of other countries, at briefing books, at staff, at other high U. S. officials, at almost anything you can think of. I had hoped that the White House’s nuclear war business was in the hands of people who were rational and calm under pressure. I was learning.

I asked myself whether business was conducted more rationally by the planning staffs in other countries. Perhaps this particular responsibility was simply too great for people? Molander witnessed three presidents who were deeply troubled by the possibility of atomic war breaking out and who “sought to leave the American people with a legacy of security with respect to nuclear war, a confidence that nuclear war would not happen. Each failed”. Roger Molander’s account shows me that people in the United States of America, right up to circles within the government, were thinking about the dangers associated with nuclear weapons. There were obviously various factions, including people who wanted “their war”. Molander also points to the circles from which resistance to nuclear disarmament came:

Within a month I had met the first of a small but not uninfluential community of people who violently opposed SALT for a simple reason: It might keep America from developing a first-strike capability against the Soviet Union. I’ll never forget being lectured by an Air Force colonel about how we should have “nuked” the Soviets in the late 1940s before they got The Bomb. I was told that if SALT would go away, we’d soon have the capability to nuke them again — and this time we’d use it.

We have to consider ourselves fortunate that on 8th December 1987 a “Soviet-American Treaty on the complete abolition of land-based medium-range nuclear weapons” was signed;¹⁵ and that President Ronald Reagan won a “small conventional” war for a small island. The “War against Terror” begun by a later president has been longer-lasting and more expensive!

¹⁴ The *Dictionary of Psychology* defines these as a “tendency to violent and uncontrolled outbursts of anger” (Arthur S. Reber, *The Penguin Dictionary of Psychology* (Harmondsworth: Penguin, 1985)).

¹⁵ Mikhail Gorbachev, *Memoirs* (London etc.: Doubleday, 1996), p. 419.

In this letter I have devoted myself to the question of whether the American president's strategic planning staff could inadvertently start a war involving the deployment of nuclear weapons. I assume I would hear a similar story about the strategic planning committees in the Soviet Union if information flowed more freely. I shall write you more letters in which I elaborate in greater detail on the consequences of nuclear war. I shall also write in greater detail about the film *The Last Epidemic*.

Regards,

W. Z.

Chapter 3: The Last Epidemic

Berlin, 7th May 2014
and 31st August 2015

Dear Astrid,

Do you know the song ‘Hiroshima’ by the group Wishful Thinking? After the instrumental lead-in the group’s frontman sings a simple sequence of notes to the sentence, ‘There is the shadow of a man at Hiroshima’. If we wished to give the singer a text in German, we would have to write: ‘Es gibt dort den Schatten eines Mannes in Hiroshima’. On its own the sentence does not sound too bad — if you have forgotten the symbol with which Hiroshima is connected. However, if you carry on listening to the song you come to the following passage: ‘And the world remembers the flame was Hiroshima’. Now everyone ought to know what the group are singing about since ‘Hiroshima’, the name of that Japanese city, reminds us of 6th August 1945, the day on which the first atomic bomb was dropped on an inhabited city. Three days later a second atomic bomb hit the city of Nagasaki. Subsequently many years passed until the world noticed the writing on the wall. Could the fate suffered by the two Japanese cities be in store for other places in the world as well? In 1982 it had reached the point that people were seeing the writing on the wall. During that year I was living in Berkeley in the United States and carrying out research there; and at that time the problems connected with atomic weapons had become abundantly clear. The inhabitants of California, too, had become aware that American cities, just like the cities in other countries, were threatened by nuclear weapons. The topic of nuclear weapons was also taken up by a conference of doctors in San Francisco which took place in November 1980. There were exhaustive discussions about what an American city would look like after an atomic bomb had been dropped on it; and, amongst other things, it was explained that the chances for any form of life, even that in North America, would be severely curtailed, if not completely non-existent, if *a limited conflict* were fought *with nuclear weapons anywhere in the world*. The doctors commissioned a film which contained extracts from the speeches given at this conference and distributed it under the name *The Last Epidemic*. I have already quoted the film several times in a letter to my brother. If, in this letter to you, I discuss the film in greater detail, then it is because I assume that you are less likely to be depressed by descriptions of the injuries suffered by victims of an atomic bomb since, as a doctor, you have already

encountered this subject matter in the course of your professional life. I really would be pleased if you could let me have any expert comments once you have finished reading this letter.

Recently I have not lived through a single year in which, on some day around 6th August, no newspaper articles have appeared reporting on just how massive the destruction caused by the atomic bombs actually was. The pictures of the devastated city then appear before my eyes and I see the almost empty, desolate plain on which the city had previously stood. On an aerial photograph of the city centre only the buildings constructed out of cement have remained standing and “white ribbons allow you to recognize where roads once ran”.¹⁶ I see the wounded, those with their burnt skin seeking to ease their pain in the river. The mushroom-shaped cloud of smoke over the city also comes to mind, which I know from the photo taken by an American reconnaissance plane. In Philipp Sonntag’s book *Verhinderung und Linderung atomarer Katastrophen* the “shadow of a man and a ladder” are to be seen “pictured on a wooden wall”. The man was “3.5 kilometres away from ‘Ground Zero’” when the atomic bomb exploded over Hiroshima.¹⁷ The song ‘Hiroshima’ does not refer to the shadow of a man standing in the sun! The man casting the shadow when the atomic bomb exploded has disappeared, but his shadow has been left behind. It is highly probable that he was far enough away from the epicentre (Ground Zero) not to be killed straightaway, but the glaring radiation burnt his skin on the side that was turned towards the light. Possibly he, too, leapt into the water of the river in order to cool his skin, as did many of the injured. I am certain that he will have carried away with him radiation damage which impaired the ability of his somatic cells to renew themselves. Even if he did not die of the injuries caused by the glaring flash of light or the objects hurtled through the air by the compression wave, he will have led the life of a man made ill by radioactive radiation. In such cases periods of freedom from symptoms alternate with periods of acute ailments produced by radioactivity. I imagine that these are the conditions in which a man counted in the “statistics” as belonging to the “survivors” passes his life.

And only four short years after I had ended my research leave in California I find myself standing in Hiroshima next to the building of the former Chamber of Industry and Commerce, over which the atomic bomb was ignited. The building is now a ruin. With the steel skeleton of its dome soaring into the sky it has been left standing as a memorial, a warning against

¹⁶ Photograph in: Philipp Sonntag, *Verhinderung und Linderung atomarer Katastrophen* [Prevention and Alleviation of Nuclear Catastrophes] (Bonn: Osang, 1981), following page 148 in the illustrative plates.

¹⁷ See Takeshi Araki and Yoshitake Morotani (eds), *Appeal to the Secretary General of the United Nations. The Cities of Hiroshima and Nagasaki* (1976), quoted from Philipp Sonntag.

nuclear war.¹⁸ Not far away a new building has been erected which houses a museum. Here everyone can inform himself about the effects of the atomic bomb and the suffering it causes people. It is not possible to tread Ground Zero itself since no path into the burnt-out ruin exists. While I stand there brooding, I see a group of Japanese wearing traditional clothes walk by. They are walking towards the museum. Next to the museum they sit on the ground, their legs crossed, and remain there in silence for a while. I sit down next to them. Later a journalist who was writing an article about the group told me that they always go there whenever an atomic bomb has been tested somewhere in the world.

In the first instance it looks as if the dropping of a single atomic bomb would be a more effective way of destroying a city than the deployment of up to one thousand aeroplanes laden with high-explosive and phosphorus bombs. After the dropping of bombs on Hamburg, Dresden and Tokyo conflagrations raged no less fiercely than in Hiroshima. The explosion of atomic bombs creates flashes of light and heat which ignite flammable material, as well as compression waves which make splinters from panes of glass, for example, into missiles. Atomic bombs have, however, one further damaging effect which is not present with conventional bombs: the harm caused by *radioactive radiation*. And this radiation continues to have an effect for many years after the dropping of an atomic bomb and kills people who did not even witness the explosion. For example, soldiers belonging to the American Armed Forces, which were stationed in Nagasaki as an occupying power, fell victim to radioactivity. Around 1980 many people in the world had realized just how dangerous radiation is and groups formed which, for that reason, pressed for nuclear disarmament. In my bookcase I have documents from that period, from 1982 and 1983, which attest to the disquiet amongst politicians, scientists and doctors in the United States. I found the originals of the pamphlets which the Hill Employees for the Nuclear Weapons Freeze had hung on notice boards. The group was using them to promote their series of films and lectures and to encourage people to attend them. On 28th October 1982 the film *The Last Epidemic* was screened in the main auditorium of the Lawrence Berkeley Laboratory. The film shows extracts from the speeches which were given at the Conference on the Medical Consequences of Nuclear Weapons and Nuclear War. The conference, which took place in San Francisco on 17th and 18th November 1980, was organized by Physicians for Social Responsibility and the Council for a Livable World. The closing credits of the film informed the audience that this symposium had been supported by institutes at the renowned University of California, namely, by its campuses in

¹⁸ Illustration in: Helmut Erlinghagen, *Hiroshima und wir [Hiroshima and Us]* (Frankfurt am Main: Fischer, 1982), p. 68.

San Francisco and Berkeley, as well as by Stanford University. I still remember very clearly just how greatly the film impressed me at the time. Recently I watched it again. The speakers' calls on the inhabitants of this planet to do everything in their power to avoid a nuclear catastrophe remain both impressive and urgent.

Present at the event organized by the Hill Employees on 28th October 1982 was Peter G. Joseph, President of the local San Francisco chapter of Physicians for Social Responsibility which had produced the film. Peter Joseph gave the audience a short introduction to the topic, especially the medical consequences of a war fought with nuclear weapons. The film's title was well-chosen since it reminded people that the great epidemics — cholera and the plague — had been conquered by co-operation between politics and medicine. In the case of a nuclear war, however, hygiene and the traditional arts of healing would be powerless. Looking back from the year 2015, I realize that the pressure exerted by the protest movement against a possible nuclear war increased markedly when the doctors joined it. Besides, the doctors did not stand alone with their goal of preventing the deployment of nuclear weapons in future wars: they also played an important role within the "Freeze" movement, which had been formed by many groups and activists in the United States bonding together. The book *Freeze! How You Can Help Prevent Nuclear War*, published by Senators Mark O. Hatfield and Edward M. Kennedy,¹⁹ lists everyone who supported this cause, amongst them many politicians. In the years that followed, the cause championed by the group Physicians for Social Responsibility was represented worldwide by the International Physicians for the Prevention of Nuclear War. In 1985 this association of doctors, which was also active in Germany under the abbreviated title IPPNW, was distinguished by the Nobel Peace Prize for its work towards the "prevention of nuclear war". For a long time I had heard nothing about Physicians for Social Responsibility and thought that they had been absorbed by the IPPNW until I received the updated version of the film *The Last Epidemic* by the producer Eric Thiermann. The closing credits of the film refer to the copyright, which lies with Physicians for Social Responsibility.²⁰ So that you have an address to which you can write should you wish to order the film for yourself, I give you the name of the sender on the envelope of the letter in which the film was packaged: Thiermann, c/o IMPACT, 1414 Soquel Av. #102, Santa Cruz, CA 95062, USA. I had, however, already written a not inconsiderable part of this letter before laying my hands on the original version of the film. At that time I had been relying on the German version of the film, *Die letzte Epidemie*, which I had discovered on

¹⁹ Toronto: Bantam, 1982.

²⁰ Box 144, Watertown, MA 02171, USA.

VHS video cassette. In the 1980s the film also circulated amongst people in Germany who advocated nuclear disarmament.

In the early 1980s a great deal of information about the effects of nuclear weapons was published which had previously been treated as “confidential”. Admittedly, as early as 1977 the American government’s Department of Energy had published the book edited by Samuel Glasstone and Philip J. Dolan, *The Effects of Nuclear Weapons*.²¹ This book formed the basis for the information presented at the conference in San Francisco in 1980. Thus a large part of that information flowed from official American government sources! Without any ado I was able simply to buy this work on the effect of nuclear weapons over the counter of a book shop in Berkeley. It also contains some results of the investigations into the victims of nuclear weapons in Japan which had previously been kept secret by the American government for years. Recently I discovered that a book on the same topic had also been published in the Soviet Union. Elsewhere in this collection of letters (Chapter 5) I shall report that until the mid-1980s the then-government of the Federal Republic of Germany classified the factual information published in that book as secret.

In many places in the film *The Last Epidemic* the speakers’ papers are accompanied by pictures taken from the film *War without Winners* (Hiroshima, Nagasaki, August 1946). In flashes the audience saw the devastated city of Hiroshima, the care of the wounded, the mushroom-shaped clouds of plutonium and hydrogen bombs which were being tested and the firing of rockets which could carry nuclear weapons. That certainly left a frightening impression! I was similarly impressed by what the speakers had to say. Right at the beginning of the film, in the opening credits, so to speak, Dr. Herbert Scoville Jr., the former Deputy Director for Research, Central Intelligence Agency, had the following to say:

The unfortunate situation is that today we are moving, sliding downhill toward the probability or the likelihood that a nuclear conflict will actually break out and that somebody will use one of these nuclear weapons in a conflict or even by accident.

This sentence is unsettling. I did not have the faintest idea of how far we had already slid down the slippery slope to nuclear war and whether we still had enough time to avert a nuclear catastrophe through our efforts. In retrospect I would say: once again we have escaped by the skin of our teeth! For me, the sentence printed in bold is an example of the readiness on the part of some former American government employees to assume

²¹ Washington: U. S. Government Printing Office, 1977.

responsibility for their country's policies, even if it means running the risk of clashing with the great and powerful in their state. I thought that this example of a citizen's commitment should spur me on to similar action.

Immediately after Herbert Scoville, Rear Admiral, Retired, United States Navy, Gene R. La Rocque took the podium. He pointed to the fact that governments of the United States had frequently declared that they would be the first to deploy nuclear weapons should the situation demand it. The translation of this section of La Rocque's speech is already included in my second letter, but at this point I wish explicitly to refer to the sentence, "And that's worldwide", which is depressingly relevant to our native country of Germany. NATO's military planning namely envisaged deploying nuclear battlefield-weapons to stop a possible attack by Russian tanks. Germany was to be the battleground for a nuclear war. In the 1980s it dawned on many an American strategist that the consequences of a nuclear war could not be restricted to a single country. Radioactivity blown into the atmosphere spreads across the entire globe; and when a certain number of nuclear weapons are deployed the ozone layer is so enduringly damaged that, amongst other things, insects go blind and can no longer pollinate blossom. This aspect was discussed at length during the conference. I consider the above contribution of the speaker as evidence for his (La Rocque's) sincerity in wanting to tackle the way in which certain circles close to the government were talking down the consequences of deploying nuclear weapons. Indeed, the article by Roger Molander already reports on these circles, which talked about the nuclear options with little competence and even less sense of responsibility.

In the following lines I shall tell you a little more about other lectures reported on in the film. Thus in his speech Howard H. Hiatt, Dean of Harvard School of Public Health, coined the phrase "the last epidemic" which subsequently gave the film its name. Professor Hiatt said:

Until recently I thought that the medical realities of a nuclear war were generally appreciated. That seems not to be the case. Many people, including some in high office, appear to be unaware of the facts; or at least to have suppressed thinking about them. If we remain silent and thereby permit that lack of understanding to persist, we risk betraying ourselves and our nation, making almost inevitable, whether by design or by chance, what could be **the last epidemic** our civilization could know.

As President of the San Francisco chapter of Physicians for Social Responsibility Peter Joseph was the host and organizer of the conference. He proposed the same topic, just in different words:

This symposium will bring into sharp focus the reality of a nuclear war. We hope that an accurately informed public, sensing this threat to its survival, will act on its instinctive aversion to communal suicide. We cannot afford to repeat our past for, as Einstein said, “The splitting of the atom has changed everything save our mode of thinking and thus we drift toward unparalleled catastrophe”.

In their papers the speakers at the conference in San Francisco exhibited a certain urgency. It was obvious that they estimated that very little time was left in which a catastrophe for humanity could be averted. If I look back at that time from the vantage point of 2015 I can still feel the relief I felt then that a disarmament treaty was concluded between the two great nuclear powers, the United States and the Soviet Union, before the beginning of 1990: we in Germany had survived the Cold War and, in addition, had the good fortune of not having to go to “hot war” as our fathers and grandfathers had done. The treaty between the two great powers had at least given us a breathing space. I hope that in future crises politicians will once again be found who are aware of their responsibility for the world and play a similar role in avoiding war to the one played by the government of the Soviet Union under the leadership of Mikhail Gorbachev.

In 2015 the silence concerning the problematic nature of nuclear weapons was deafening. However, was the problem solved by one or two disarmament treaties? Today the voices pointing out the still-present danger of a nuclear war are becoming louder again. Indeed, the danger will never be over now that the “genie of nuclear fission” has been let out of the lamp once and for all. Humanity is condemned constantly to be on its guard. **We must be on our guard!** The film *The Last Epidemic* has lost nothing of its urgency. Even if we believe that nuclear war is highly unlikely, we must — as a matter of urgent necessity — talk about the dreadful destruction associated with the deployment of nuclear weapons. We scientists ought to provide the impetus for such discussions: we owe it to mankind, for the consequences of the deployment of nuclear weapons are too terrible.

I shall now turn to the sequence at the centre of the film. This is the speech by the doctor H. Jack Geiger from New York. Jack Geiger was Professor of Community Medicine at the City College of New York. Jack Geiger’s work in New York must have been much the same as that of a doctor who worked in community health care in Germany in the 1970s. Jack Geiger spoke at length about the possible consequences of dropping a nuclear bomb with the explosive force of a megaton of TNT (the conventional explosive Trinitrotoluol) onto a large city and took San Francisco as an example. He asked himself the following questions: “What will happen to San Francisco in the event of a specified nuclear attack? What will happen to

its people? What will happen to its physical environment? What will happen to its biological environment? What will happen to its structure of medical care?”. I found a pamphlet from those years in which German doctors discuss the same questions and evaluate the consequences of dropping an atomic bomb over the Brandenburg Gate in Berlin. Jack Geiger included the following sentence in the first section of his paper: “We are dealing, in short, here with events that because of the lack of precedent may be specifiable but almost unimaginable”. The sentence addresses the problems experienced by the author when using academic language to paint a picture of the catastrophe towards which we slide. With scientific language we are able to specify what happens to a city on which an atomic bomb with an explosive force of fourteen kilotons of TNT is dropped. We have data gleaned from the experience of dropping atomic bombs on Hiroshima and Nagasaki. We have a concept because we have been shown pictures of the ruined cities and people with their skin peeling off and because we have read lengthy, detailed reports about this event. However, in the case of a hydrogen bomb with the explosive power of a megaton of TNT we must try to “imagine seventy Hiroshima bombs, all at once, all in one place”! In the arsenals, hydrogen bombs with twenty megatons of TNT are stored ready for use, so the equivalent of fourteen hundred atomic bombs of the type dropped on Hiroshima! No one has had any experience of that, but the consequences can be calculated with scientific meticulousness and precision. In his lecture Jack Geiger demonstrates how events of this sort can be described in scientific language. Scientific terms are used and numbers are calculated. However, in the process it becomes evident that scientific language is ill-equipped if the apocalyptic dimensions of the catastrophe are really to be imagined. I, too, could tell you a tale about that, since I have wrestled with this problem in various situations. For the situation that prevails in a war fought with nuclear weapons a different language and different modes of description should be found. I know a series of authors who dared to undertake this task at the time and very frequently earned themselves the reproach of deliberately spreading panic amongst people and of deliberately causing trauma. As far as I know, no such reproach was levelled at Jack Geiger for his paper at the conference in San Francisco. He maintained his calm style of lecturing throughout and achieved his aim of making it clear to us that almost all blueprints that have been drawn up for survival in a nuclear war are “wrong” and “misleading”. At great length and in considerable detail Jack Geiger addresses the question of whether and how the doctors who might survive in the city could possibly look after the people wounded in the explosion and reaches the conclusion that only very few of the wounded would even get to see a doctor. He concludes: “The survivors will envy the dead”. This sentence stands in his

text as if cast in stone. I later also heard the sentence in someone else's mouth and I see that it has remained in people's memories to this day.

Now I notice that I am not able to convey the horror which seized me when I watched the film *The Last Epidemic*. Unfortunately, you will just have to watch the film for yourself. If you want, I can also send you the text of Jack Geiger's manuscript. Here and now, however, I would still like to document the way in which Jack Geiger elaborates on the "specifiable events". He says:

A single explosion, an airburst at seven thousand feet, over downtown San Francisco, in the fall, on a clear day, a working day, let's say a Monday, in dry weather, at about three o'clock, in short, let's say today, now, at this moment.

He had copied the map of San Francisco which could be obtained free of charge from the American Automobile Association (AAA) onto an overhead projector transparency and on it drawn circles which depicted the distance to the bomb's Ground Zero. The nature and severity of the injuries sustained by the victims of the atomic bomb would depend on the distance from the epicentre. According to Geiger, in the first circle, which has a "radius of about one and a half miles", the "overpressures are twenty pounds per square inch". This amount of pressure would "destroy everything". The pressure waves expand causing:

winds [of] five hundred miles an hour. Reinforced concrete and steel buildings of the strongest construction will either collapse totally or have all of their floors swept out from within the structure. The heat is such that most everybody will be either vaporized or killed by third-degree burns, if indeed they are not killed by other trauma. Circle two, with a radius of three miles, has overpressures of ten pounds per square inch, winds at a hundred-sixty miles an hour, brick and wood-frame houses destroyed, exposed people seriously burned.

Jack Geiger stated that the bomb whose characteristics he described in this way would immediately kill 780,000 people out of the approximately 3.6 million who live in the San Francisco area. A total of 1,162,500 would be affected, killed outright or wounded, "almost precisely every third person". Then Jack Geiger described the fact that two bombs, each with a force of twenty megatons of TNT, would "really do the job, 3,407,000 people killed, that's ninety-four per cent of the population, and all of those who are not killed are seriously injured or incapacitated, that's a hundred per cent of the population". Those left alive would have lost the basis for their existence (accommodation, food, clean water and clean air), with the

result that the entire population would be affected. This devastation would be brought about by the hydrogen bombs which existed in such numbers in the arsenals of the great powers.

Depending on the megatonnage of the bombs deployed, within a radius of eight to sixteen miles fire storms would rage which would resemble those that developed “after a series of conventional air raids on Hamburg, Leipzig and Dresden”, fanned by the fresh air rushing in:

They produced temperatures estimated at eight hundred degrees centigrade, 1472 degrees Fahrenheit. Days after the raid, as some shelters were open, enough heat was found to have remained so that the influx of oxygen caused the entire shelter to burst into flames. [I]n Hamburg, in Leipzig the only people who survived were those who fled their shelters, not those who stayed in them, because the shelters simply turned into crematoria at those temperatures.

In the film there follow descriptions of the injuries with which the medical personnel — provided they had themselves survived — would have to reckon after the dropping of an atomic bomb. There would be people facing certain death within hours or days because they “have had a thousand rems and are not going to survive no matter what anybody does with whatever kinds of resources”. Similarly, “[i]t will be impossible to distinguish on the basis of symptomatology between [them and] people who have had only a hundred rems and might survive with adequate care”. The unit “rem” is an abbreviation for “**R**öntgen **e**quivalent **m**an” and thus a measure of the energy deposited in a person’s body tissue by radioactive radiation. In order to take into account the differences in the hazardousness of the various types of radiation, a separate weighting was defined for each one. High-energy gamma radiation and neutron radiation count as extremely dangerous (weighting of ten).

I remember that a doctor, referring to this statement, said that he was afraid of the situation that would pertain after the possible deployment of a nuclear weapon because after the dropping of such a bomb he would have to tell many victims that he could do nothing more for them as a doctor. They would be left to die without any sort of medical care. Those who had sustained only minor injuries after the dropping of an atomic bomb would not be treated since they would also recover without medical help. It would be his task to decide, on the spot and on the basis of the injuries, for which victims medical intervention would be appropriate and could save their lives. When I heard this once again I remembered that in 1986 my wife Eva had reported a discussion she had heard amongst doctors in the clinic where she was working at the time. In view of the threat posed by nuclear weapons the medical profession in Germany had been charged with developing concepts of what

“catastrophe medicine”, or medicine for disaster victims, might look like after an attack with nuclear weapons. After the accident at the nuclear power station in Chernobyl this topic became very current. For the doctors in the clinic the approach described by Jack Geiger was not new. They knew that this type of treatment was known as “triage” and had been used in the medical care of soldiers wounded on the field of battle since the Napoleonic Era. In the case described by Jack Geiger this was, however, a variant on triage, one with civilians who were to be treated after the dropping of a nuclear bomb. At the end of this letter I quote the powerful words which Jack Geiger used to condemn any doctors who were prepared to let triage guide the care they gave the injured during a conflict with nuclear weapons.

At the time American viewers were so affected by the film because the nuclear catastrophe took place on American soil — luckily just in the “imagination” — and not in Japan. The image of Hiroshima after its destruction which showed only the skeletons of solid concrete buildings on an empty plain could easily be transferred to San Francisco, for this city, too, consists for a large part of wooden houses. The most beautiful amongst them are called “painted ladies”. Whoever watched the film to its end was convinced that the system of medical care and the provision of essential goods would collapse and that the society which would then be possible would bear no resemblance to the society with which we are familiar. Directly after the earthquake in 1906 it was possible to start rebuilding San Francisco. After the dropping of an atomic bomb this would not be possible since the land would be contaminated by radioactivity. Would it even be possible to rebuild city and society after a war with nuclear weapons? The hypothetical destruction of San Francisco described by Jack Geiger was caused by a single atomic bomb. The explosive force of this one bomb was put at one megaton of TNT in order to have a basis for his calculations. Planning by the military envisaged the use of hydrogen bombs to destroy large cities. As mentioned above, in his lecture Jack Geiger expounded at length on the situation that could be expected in the medical treatment of the victims and expressed his expectation that the injured would most probably not receive any medical help before they died.

In his lecture Jack Geiger could draw on remarks by Kosta Tsipis, Associate Director of the Program in Science and Technology for International Security at the Massachusetts Institute of Technology in Boston. In response to a question he asked himself — namely, exactly how much a million tons of high-explosive material were — Kosta Tsipis came up with the following answer:

A million tons of high explosives would take a train two hundred miles long to carry. That's how much a million tons is. A million tons of high-explosive materials have enough energy in them to melt [...] 1.6 million tons of ice and make it steam.

In the hydrogen bomb an explosion generating this massive amount of energy would require only a small volume (about the size of cigarette packet) and would take much less than a second. These two facts are the reason why the devastation caused by a bomb is so much greater than that caused by an earthquake, which would spread the same amount of energy over, for example, the two hundred miles.

We know that over the years various types of bomb were developed which could be deployed in the most diverse situations. The arsenal of the military includes bombs which penetrate the ground before exploding. They are suitable for destroying air-raid shelters. For the "nuclear battlefield in Germany" smaller calibres were envisaged in large numbers which were, in part, to be fired with artillery cannons. The same cannons could be deployed with conventional ammunition ("dual use"). The possibility of war in the "European theatre" would probably not have caused the citizens of the United States any sleepless nights since the battlefield envisaged for the deployment of these weapons lay far away from their home. However, they were not entirely aware that many of the consequences of dropping an atomic bomb know neither national boundaries nor distances. As we know, the doctors expounded upon this fact. However, during my stay in the United States I noticed that American citizens were uneasy for a reason that had hitherto not been discussed. People there had learnt about the possibility that their "own" American atomic bomb might explode on American soil, namely due to failure of the fail-safe system. In Oakland or Alameda, cities in the vicinity of Berkeley, maintenance was carried out on aircraft carriers which also had atomic bombs on board. We may assume that these included hydrogen bombs. The technical safety of atomic bombs became another topic in the debates. After my return from America German citizens also began to question the safety of atomic weapons. The Federal Government at the time failed to answer these questions; rather they hid behind references to secrecy.

The problematic nature of nuclear weapons would certainly have merited rather more attention from the German Federal Government of all governments! I repeat this, since in Germany we were living in territory that was in extreme peril. The military strategists in the United States and the Soviet Union knew full well that a war begun with conventional weapons could very easily escalate into a war with nuclear weapons. In Germany the density of nuclear weapons was particularly pronounced and the country could easily have turned into

a nuclear battlefield. In his lecture, given in 1980, Gene R. La Rocque, the retired Admiral in the American Navy, addressed this possibility:

My life has been spent in planning for both conventional and nuclear war. [...] We (the USA) possess some twenty thousand nuclear weapons, of which ten thousand are pointed towards the Soviet Union. The Soviet Union possesses twenty thousand nuclear weapons, of which six thousand are pointed towards the United States. The other countries, the English, French and Chinese, together possess approximately one thousand. Together that is somewhat more than fifty thousand nuclear weapons in the whole world.

Most Americans think: “Yes, but we have thirty thousand soldiers in Europe! Why do we have to rely so strongly on nuclear weapons?”. They think that if we only spend enough money on conventional weapons, then we could somehow get away from a nuclear war. That is completely wrong! We have nuclearized our conventional forces. All of our conventional forces, our army divisions, our air wings, our navy ships are all nuclearized. Seventy per cent of our war ships are armed with nuclear missiles. One of the reasons this arms race keeps going is that military men honestly think they could win a war, a nuclear war, any kind of war!

The film *The Last Epidemic* had a considerable impact in America. Today I ask why that was the case and cite three reasons for it. First, it was doctors who addressed the public sphere and because doctors enjoyed considerable social prestige their words were credible and carried weight. Doctors carry the responsibility for the health of a nation’s citizens; and by taking the Hippocratic Oath they enter into a commitment “to help the sick” and to “abstain from all intentional wrong-doing and harm, especially from abusing the bodies of man or woman”. Thus it was clear to everyone that they would not hesitate to express their opinion on issues in society which threatened to get out of control. When the doctors identified the mountain of nuclear weapons, which was growing from year to year, as a problem crashing down on society like a landslide, people listened. What course was the world actually steering if the arsenal of nuclear weapons was to grow without limitation? Not a few people were already experiencing the first vague symptoms of unease. Was the time not ripe for intervention?

The group Physicians for Social Responsibility organized a congress on the medical consequences of a war with nuclear weapons. In the film the congress proceeds authentically. One could imagine oneself present at the discussions. It was to be expected from doctors that they would wish to gain clarity about the origins and course of an epidemic. If doctors suspected that nuclear weapons posed a perhaps even greater threat to the population’s health

than the terrible infectious diseases, then they would follow up this suspicion and suggest preventative measures if they considered them necessary. At the conference there was no ban on what people might think and no narrow, restrictive delineation of the topic. That, too, is normal at academic conferences. If, for example, cholera is the topic, experts on hygiene and social medicine speak, as Rudolf Virchow once did; and if, as at this conference, radiotherapy was discussed, then nuclear physicists, engineers and members of the military were present and could make contributions. The person giving the lecture decided for himself what topic he wished to discuss in his paper and thus participants at the congress acquired new knowledge about things which were otherwise difficult for them to access.

The contributions by the outside experts who had been invited were characterized by the fear that the world was “going over the edge”. Especially Kosta Tsipis of the Massachusetts Institute of Technology calculated that in the first week after the explosion of a one-megaton bomb an area of almost thirty-three thousand square miles would have to be abandoned if the residents were to be protected from radioactivity; and an area of twenty-three thousand square miles would have to be abandoned for a month. The nitrogen-oxide molecules created in the explosion would reach the altitude of the ozone layer and “eat up” the ozone. The protection this layer gives us against the effects of ultra-violet radiation would be lost; many animals, birds and insects would go blind and the whole ecological system would collapse, since “if you don’t have insects, for example, to pollinate the flowers you’re not going to get fruit”. Bernard Feld of M. I. T. predicted unacceptably high radioactivity of some twenty units of radiation per head of the global population if the exchange of blows between the great powers that had been discussed by the military were to take place and during it bombs with a total energy of between ten and twenty megatons each were deployed. Bernard Feld was a professor at the Massachusetts Institute of Technology in Boston and editor of the *Bulletin of Atomic Scientists*. In his deliberations on how medical provision for the injured and a functioning society could be rebuilt, Jack Geiger reached a complementary conclusion: “The biological survivors in fact have in all probability merely postponed by days, weeks, months, at most a few years, their deaths from secondary attack-related causes”.

At the conference in San Francisco the then-President of Physicians for Social Responsibility, Helen Caldicott, was the last person to speak:

It doesn’t matter if we immunize our babies so they won’t develop pertussis and tetanus. It doesn’t matter if we give them good, nutritious food. It doesn’t matter if the marital relationships are good so that children grow in an emotionally secure

environment. When you look at the concept that maybe over the next decade these children, that we are working to nurture, protect and love, will be dead. [...] [...] and what every single one of us should be working to protect: the babies of this world, who will pass the gene pool on to future generations. [...] For what is our responsibility towards God? To continue this process of wonderful evolution that we know as physicians has taken billions of years to happen.

Second, as usual at the end of the conference the organizers issued a press release, whereupon mostly just a short notice appeared in a newspaper. At this point Physicians for Social Responsibility took a different path. They did not spare the expense of contracting the producer Eric Thiermann to film a documentary of the conference. The camera recorded the speakers just as they presented themselves. At the time I attended other conferences at which the VHS video system, which had just appeared on the market, was used to record the papers. The doctors who had organized the congress on the medical impact of nuclear weapons avoided “being forgotten”. They offered copies of the film to their colleagues and hoped that in this way the information would reach the broader public.

In my view, the third reason for the success of the campaign can be found in the doctors’ approach. They dramatized nothing in their lectures: rather, they presented indisputable facts, drew comprehensible conclusions and left behind them the impression that some doors remained unopened, those behind which the most grievously affected patients lay. The doctor giving a paper stood before his audience as a person; his gestures and manner of speaking were those of a doctor.

Around the same time as the initiative by Physicians for Social Responsibility other groups were formed which took up the topic. I found shocking descriptions and images of victims of atomic bombs in various books. The International Physicians for the Prevention of Nuclear War (IPPNW) published the book *Last Aid: The Medical Dimensions of Nuclear War*,²² which was based on a conference which had taken place in the capital, Washington, in March 1981. I have already mentioned the book by Philipp Sonntag, *Verhinderung und Linderung atomarer Katastrophen [Prevention and Alleviation of Nuclear Catastrophes]*.²³ Both books describe the destruction of Hiroshima and Nagasaki and the injuries suffered by people after the bombs were dropped on these cities. Robert Scheer wrote the book *With Enough Shovels: Reagan, Bush & Nuclear War*,²⁴ intended as a political commentary on nuclear war and civil

²² San Francisco: Freeman, 1982.

²³ Bonn: Osang, 1981.

²⁴ New York: Random House, 1982.

defence. The title *With Enough Shovels: Reagan, Bush & Nuclear War* plays on a statement by T. K. Jones, Deputy Under Secretary of Defense for Strategic and Theater Nuclear Forces, who had suggested the following protective measure:

Dig a hole in the ground, cover it somehow or other with a couple of doors and throw three feet of dirt on top. It's the dirt that does it. If there are enough shovels to go around, everybody's going to make it.

The effects of nuclear weapons are covered at great length in the book by Samuel Glasstone and Philip J. Dolan, *The Effects of Nuclear Weapons*.²⁵ This book, which I have mentioned a good number of times, also expounds upon the way atomic bombs function. Since reading this book I have had a strange feeling, a mixture of astonishment and horror, which crept over me when I noticed that the principles on which atomic bombs function are at the centre of physics and that no barrier exists between the peaceful and military applications of the pertinent findings in physics. I even thought I noticed a certain pride in discovery when, for example, a weapon was introduced which had been optimized to fit a particular combat situation. I learnt that the American forces had nuclear grenades with a variable explosive force and that soldiers could set the strength of the anticipated explosion on these grenades before firing them. With the help of the guidance given in *The Effects of Nuclear Weapons* it was possible to calculate the size of the crater caused by the bomb and the height of the wall of debris thrown up by the bomb. In order to simplify the calculations a circular calculator made out of cardboard was enclosed. This disk resembled the "calculator, a shopping aid for calculating or comparing prices" which used to lie in our kitchen. For people with an imagination it must, I think, be a curious picture to imagine a gunner sitting next to his cannon on the field of battle and using the rotations of a cardboard disk to decide what explosive force to set on the high-tech nuclear grenade before firing it.

At the end of his lecture the doctor Jack Geiger said:

It is my belief that any physician who even takes part in emergency medical disaster planning, specifically to meet the problem of nuclear attack, any physician who even takes part in such an activity is committing a profoundly unethical act. He is deluding himself, or herself, his colleagues and by implication the public at large into the false belief that mechanisms of survival in any meaningful social sense are possible. But there is a positive responsibility as well as a negative one, I think, and that is the obligation to assess these data, to inform, to instruct, to take advantage of the experience that has given us, individually at least, part of our work experience with

²⁵ Washington: U. S. Government Printing Office, 1977.

death, to be active in the political process with regard to these problems, to make clear what as physicians concerned with healing, our data are and our views are. And I feel increasingly urgent about that. I think the time is limited. I think the responsibilities that we face are awesome. I welcome your participation in this conference as a first or continuing step in the assumption of those responsibilities.

I remember that at the time the governments of several countries brought considerable pressure to bear on doctors to oblige them to give medical care to disaster victims in the case of a nuclear war. The triage described above was promoted as the model for this sort of medicine. If a doctor were to proceed according to the rules of triage, he would have broken the Hippocratic Oath, which obliges him to give every person medical care. Using the words quoted above the doctor Jack Geiger protested vehemently against the Federal Emergency Management Program developed at the time by the Office for Civil Defense Mobilization to plan strategies for survival. The planners declared cheerfully that “if they were just given enough funding and a little time they could work out plans to protect up to eighty per cent of the United States population in the event of an all-out nuclear exchange”. The technique they had in mind was mass evacuation, which they could effect in “only eight days”. Jack Geiger considered this to be utterly unrealistic since in his paper he had painted a picture which allowed no possibility of long-term medical provision after an attack with an atomic bomb.

In Berkeley I learnt a great deal that I was later able to put to good use in Germany whenever the discussion turned to nuclear weapons. Much of what I learnt was extremely shocking; I have not discussed it in this letter, or have done so only on the margins. Even if the “peace groups” in Germany did not succeed in persuading the government of the Federal Republic of Germany to alter its military policy, the “Freeze” movement and coalitions for action against nuclear weapons enjoyed great success in Europe. Please remember: the presidents of the “Superpowers” concluded a treaty for the reduction of nuclear weapons and defused the incendiary situation in the Fulda Gap and the Thuringian Balcony. However, the question “What about nuclear safety?” remains topical today.

Best wishes,

W. Z.

Chapter 4: The Balance of Deterrence

Berlin, 14th May 2014

Dear Michael,

This letter is one of a series of reports I have written about my research sabbatical in Berkeley, USA, in 1982 and 1983. Since you recently expressed a keen interest in learning more about the bad feeling I had about “politics under the nuclear umbrella”, I thought I would simply write you a letter. In the following lines I shall look at the “balance of deterrence”. In the more than thirty-five years since the dropping of atomic bombs onto the Japanese cities of Hiroshima and Nagasaki, the “military-industrial complexes” had manufactured nuclear weapons year upon year, with the result that in 1982 an “arsenal of terror” was overflowing with a sum total of sixteen thousand warheads for both sides. In addition it contained “approximately thirty thousand warheads for middle- or short-range deployment”.²⁶ The explosive power of these weapons was so huge that the whole of humanity could have been wiped out more than once. This was called “overkill”.

The term “military-industrial complex” had been introduced by the American President Dwight D. Eisenhower in his Farewell Radio and Television Address to the nation on 17th January 1961. In this address he expressed his grave concern that the military establishment and their allies in Congress were on their way to becoming a threat to the continued existence of democracy. President Eisenhower’s warning went unheeded. On 18th January 1981 George B. Kistiakowsky felt compelled to publish a pamphlet in which the President’s entire speech was printed.²⁷ Kistiakowsky had collaborated on the development of atomic bombs within the framework of the Manhattan Project;²⁸ had become advisor to President Eisenhower; and in 1981, as Professor Emeritus for Chemistry at the University of Harvard and President of the Councils for a Livable World, turned to the American public with his print of Eisenhower’s speech.

For a long time people in all countries across the globe allowed themselves to be reassured by the model of the “balance of terror”. According to this model, a first strike, one carried out by

²⁶ Edward Kennedy and Mark Hatfield, ‘The survivors will envy the dead’, *Der Spiegel*, 17 (26th April 1982), 149 ff..

²⁷ In 1982 it could be obtained from the Council for a Livable World, Education Fund, 11 Beacon Street, Boston, Massachusetts 02108.

²⁸ A project in the Second World War charged, amongst other things, with the research into and development of nuclear weapons. It was led by the United States and supported by the UK and Canada.

land-based intercontinental missiles, submarine-launched long-range missiles or long-range bombers, would provoke the enemy into responding with a second strike, using similar launch systems, with the result that ultimately both countries would lie in ruins, all their populations killed. “He who shoots first dies second”, was the handy description of this model. Despite emerging doubts many people continued to rely on the “scales” of military balance remaining equally poised because — or so they thought — those in power on both sides — that is, in the United States of America and the Soviet Union — would act rationally and possessed a sufficiently strong sense of responsibility not to start a nuclear war. I had my doubts for one simple reason: up to that point no United States government had declared they would renounce the “first use” of nuclear weapons.

Fundamentally, it was possible for the “balance of deterrence” to fail for three reasons:

First: in both military blocks — which were keeping a watchful eye on each other — there could have been strategists who calculated the advantages for their country if they carried out a nuclear attack. I covered this topic in my first letter.

Second: recent developments in weapon technology could have reduced or completely thwarted the ability to launch a counter-attack after a surprise attack. One example is the Strategic Defense Initiative programme, which was launched under Ronald Reagan, the then-President of the United States. In Germany this initiative became known by a name adopted from the film industry: “Star Wars”.

Third: purely by chance, a technical failure in one place in the fail-safe system of the technology of the atomic bombs could have led to nuclear war. This is the point I would like to address in this letter.

The image of a duel between the heroes in a western could be used to portray the state of international security at that time. Many a time the film industry in Hollywood, California, has seen the clapper-board clapped prior to filming this particular cliché. It was not just in America that viewers loved the following scene: the adversaries stand at a prescribed distance from each other on a dusty square or street; each has a clear view of his target; nothing can intercept the flying bullet. Their weapons are in their holsters, ready to be fired. They keep a watchful eye on each other, looking tensely to see whether their opponent draws his weapon. Then they must be quicker on the draw in order to survive. They have complete faith that their own pistol will function properly. No doubt that the technology is reliable! If this balance of threat and counter-threat endures forever, no one will die — but does that mean being forever rooted to that particular spot? In the worst case, both drop down dead

after shots have been exchanged. At the end of a box-office hit the good guy must, of course, be the victor and the bad guy lie in the dust! When such films, produced by the manufacturers of dreams, have reached their end we wake up to a reality in which the worst case is easily the most probable. When I discussed my fears with the one or other member of the Hill Employees for the Nuclear Weapons Freeze, they agreed with me, remarking that history presented enough examples of the build-up of arms between two nations leading to war, but that the arms race had, on the other hand, only rarely been abandoned because one of the adversaries went bankrupt. They wanted to engage in a third type of political involvement, one in which the heroes left the field of battle without even one of them having pressed the trigger.

The metaphor behind films of this type — that of the “Lone Ranger” — is part of the foundation mythology of the United States. In American usage a “ranger” is a member of a mounted peace-keeping force. The “lone hero”, relying only on himself, fights to protect his town and his citizens, fights for his country, for freedom and justice. The film *High Noon* is a pithy, classic example. The sheriff, who is in the process of embarking upon his well-earnt retirement, takes his leave of the citizens whom he has protected for so many years. His wife, whom he has just wed, is standing by his side. When the news unexpectedly bursts in on them that three villains, newly released from gaol, are on their way to the town in order to harass and attack its citizens, he pins his star back onto his chest, fails to find allies despite an intensive search and fights alone against the three. Several times he comes close to being killed himself, but always has either a bullet or a trick up his sleeve that gets him out of an almost hopeless situation.

In the end Good triumphs! The Hollywood film industry has produced modern versions of the “Lone Ranger” which invite us to identify with them. In the film *Taxi Driver* (1976) the hero arms himself with artfully constructed revolvers before penetrating the gangsters’ den. In Ben Affleck’s film *Argo* (2012), which I saw recently, even the film industry succeeds in liberating American citizens from Iran by putting into action a risky, cunning plan.

The film *Argo* alludes to events which had taken place several years before the start of filming. Certainly, in 1982, when I arrived in the States, memories of the occupation of the American Embassy in Iran were still fresh. In 1980 an abortive attempt had been made to free the hostages in the embassy in Teheran by means of a commando operation using modern helicopters. President Jimmy Carter, whose manner had been conciliatory, was blamed for the failure. He later lost the election and was replaced by Ronald Reagan, who in public was

able to convey the impression that he would tackle matters more energetically and effectively. Indeed, in the eyes of the nation Reagan was successful: those in power in Teheran put an end to the occupation of the embassy and allowed the American hostages to leave the country. In this way a conflict which advisors to the American President had classified as extremely dangerous came to a satisfactory conclusion. Roland Molander writes about it in his article ‘The Greening of a Nuclear Strategist’, which appeared in the newspaper *Tribune/TODAY* on Sunday 28th March 1982. Below is the passage dealing with the Iran crisis:

The day after the raid, as we all waited to see how the Iranians would react and what fate held in store for the hostages, I encountered a friend, a general, in the dimly lit halls of the Old Executive Office Building. We both knew all too well that the favourite Pentagon war game scenario for the start of World War III was a crisis in Iran. Now we had one. What if the Iranians killed the hostages? What would the Russians do if we retaliated?

As the conversation drew to a close, he said, “You know, I called my kids last night.” He hesitated and then continued. “I never call my kids.” His kids were grown up.

Thus far I have quoted from the article by Roger Molander. At the time, this peculiar “balance of terror” was also discussed at length by the Hill Employees in Berkeley. Amongst them it was known as “Mutual Assured Destruction”. I do not know whether that was an official designation. The expression goes right to the heart of the matter. Many residents of California who enjoyed playing with words had made a habit of creating new words out of the initial letters of long terms or titles. Thus **M**utual **A**ssured **D**estruction yielded the adjective ‘**MAD**’. I was familiar with the word “mad” from the saying, “Mad dogs and Englishmen go out in the midday sun”.²⁹ Hence I knew that “mad” had something to do with “insane” or “crazy”. Langenscheidt’s dictionary revealed more about the various meanings of the word “mad”.³⁰ The word comes under the heading of “shifting concepts”, words whose meaning changes slightly to fit different contexts. The word “mad” is used when a person is “crazy (or mad) with pain”; or “beside himself with rage (or mad) at having missed the train”; when a person is “crazy (or mad) about music”; or even in case of a “rabid (or mad) dog”. “Mad” always puts in an appearance if the mood or state of mind of a dog, person or other living creature is out of balance. His (or its) balance may have been destroyed by perfectly harmless, banal things. For that reason my friends in America preferred to use the adjective

²⁹ A song by Noël Coward first performed in *The Third Little Show* at the Music Box Theatre, New York, on 1st June 1931.

³⁰ *Langenscheidts Enzyklopädisches Wörterbuch* (Berlin: Langenscheidt, 1963).

“insane” rather than “mad”. “Insane” is the term used in psychiatry for “mentally ill” or “mad”.

The word “lunatic” was also used by the circle of the Hill Employees when referring to a person who believed in the balance of terror. I assumed this expression had something to do with “luna”, the moon. “Lunatic” evoked images in me of someone who was moonstruck or a dreamer. This image fitted as well! If someone wished for himself that the balance of terror might never lead to the end of the world, then it was not wrong to compare this hopeful dreamer to a sleepwalker on the roof ridge of a house who does not plummet to earth so long as he does not awaken from his dream. For the catastrophe that a war with nuclear weapons would entail the Hill Employees used the Biblical term “Armageddon”. In the Revelation of Saint John (16:6) Armageddon is the name of the place “where the forces hostile to God will gather for the last great battle during the end of days”.³¹ In 2014, when people were discussing how the First World War could have come about, the historian Christopher Clark used the word “sleepwalkers” to characterize the governments then in power in the key European nations.³² Christopher Clark became embroiled in a heated controversy with historians who continued to be convinced that the German government bore the sole blame and had, in their opinion, deliberately worked towards war in full knowledge of the risks. When I noticed that in 2014 our situation was possibly similar to that of people in 1914, Clark’s analysis of history filled me with terror. If Clark was right, was the image of the dreamer from the time before the First World War not appropriate for our age as well? Herbert Scoville Jr. had characterized this image as follows: “The unfortunate situation is that today we are moving, sliding downhill toward the probability or the likelihood that a nuclear conflict will actually break out”. When quoting this sentence by Herbert Scoville Jr. in Chapter 3, I was not yet so terrified, since I thought that it was both a warning and simultaneously a call to do everything possible to come down off the slope.

Are these word games really powerful enough to describe the problem with nuclear weapons? The burning question was this: how great was the risk that the balance of terror would break down with devastating results? The background to this question was the fear of a war which might escalate and lead to the end of the world. If we are threatened by such a comprehensive catastrophe, then logic dictates that we cannot afford any degree of risk whatsoever. This is

³¹ In German: ‘an dem sich die gottfeindlichen Mächte zum endzeitlichen letzten großen Kampf versammeln’ (Brockhaus, *Die Enzyklopädie*, vol. 9 (Leipzig 1996), p. 500).

³² Christopher Clark, *Die Schlafwandler. Wie Europa in den Ersten Weltkrieg zog* (Munich: Deutsche Verlagsanstalt, 2013); original: *The Sleepwalkers: How Europe went to War in 1914* (London: Allen Lane, 2012).

the only responsible response! Since any technical equipment is fundamentally freighted with risk, however small it may be, this means the system of deterrence described above must not be put in place. However, the superpowers have not observed this “prohibition”. With the “balance of terror” they had already erected the proscribed system; and had done so before people had been given the chance to reflect on it from a scientific, religious or philosophical perspective. Thus subsequent generations could only pray and demand that the risks of a system failure were, at least, kept as low as possible. However, even if this demand were met, the survival of humanity in the near future is not guaranteed, since in the case of low-probability events it cannot be predicted when any individual incident will occur, whether as early as tomorrow or perhaps not for one million years. I have never heard the people who constructed this system being called criminals, despite its being suitable for genocide. Do we want to give them this name? They are not only committing a crime against humanity, but also risking the extinction of humanity and our matchless natural world. Or is there a different name for people who consciously and actively work towards a nuclear war?

In order to acquire greater clarity in my own mind about the risks arising from the technical failure of a bomb, I shall have recourse to a story which I dreamt up in a different context. The story is set in the technical department of an accelerator, but its subject matter could equally well be the control centre of some other large facility. The story runs as follows:

A modern accelerator had been built. The control desk from which the machine was operated looked brand new. It had far fewer buttons than the control desk of the old accelerator as its operators were now able to set or adjust almost everything using the computer. Only a few buttons were left which, in an emergency, could be used to switch off sensitive equipment directly. Amongst these buttons was one bearing the legend “world-destruction button”. This button was new and had been missing from the old accelerator. A sign underneath it carried the warning: “Do not press; button triggers world destruction!”. For a while people saw the button but paid no further attention to it. One day I overheard a couple of operators discussing whether this button was the work of a joker. They speculated that the button was only there to find out whether someone would ignore the warning. Perhaps there was even a counter attached which recorded any disobedience. Perhaps the button was just meant as a joke and was not actually connected to anything. On the very same day one of the technicians opened the control desk and discovered that a bundle consisting of several cables was connected to the button from below. The idea of simply cutting the cables was rejected as they did not want to risk sparking off the end of the world solely by slicing through a cable.

For a long time nothing happened. One morning the operator on the night shift plunged the engineer relieving him into a state of blind panic when he declared that during the night he had pressed **the** button. He continued that, as everyone could see, nothing terrible had happened! He then expressed the hunch that the entire wiring system had no function and pressed the button a second time. Once again nothing happened. Word of this incident got about.

A couple of days later an operator found a message on a computer screen. This stated — for everyone to read — that the button was only active in the week when the six lottery numbers drawn the previous Saturday were exactly the same numbers as had been entered into the electronic memory of the button. The six numbers stored in the memory were not disclosed. Someone was playing the lottery according to the “old lottery system” and waiting for the main prize, the end of the world!

However, the chances of winning the lottery with six correct numbers are very slight. Someone knew the formula which could be used to calculate the chances of landing the main prize. A pocket calculator was at hand and so it was not long before the odds of six “correct” numbers out of forty-nine were calculated as 13,983,816 to one! Now Erwin, who was known to play the lottery every week, was teased mightily. People said he was stupid even to go to the betting office when the chances of winning the main prize were so very slim. Erwin defended himself as best he might and said that almost every week someone playing the lottery got six right numbers. Besides that, every week he handed in seven lottery tickets, thereby increasing his chances of success!

For Erwin the matter was completely clear. Every week he hoped that “his” numbers would come up in the lottery draw, but could, on the other hand, easily get over the money he had spent buying the lottery tickets. He suffered only minor damage if he did not win anything. By contrast, the operators did not have to pay anything when they pressed the button but the damage would be immeasurable if those six “right” numbers just happened to be stored in the button’s memory. Then the entire population of the world would suffer the damage! This story leaves the following question hanging in the air: would responsible scientists push the button even if the risk of the end of the world did stand at roughly fourteen million to one?

It would make me happy if I could write to you saying that I would go to the stake for my scientific colleagues and could answer the above question with “No!”. Of course, I invented the story of the operators, but it is also adapted from a real event which played out in summer 1942 within the context of the American project to develop an atomic bomb. Peter Goodchild

talks about it in his book on J. Robert Oppenheimer.³³ It was Edward Teller who, when thinking about the construction of hydrogen bombs, stumbled onto the possibility that the atomic bomb could “set on fire” the earth’s atmosphere.

According to Teller’s initial estimates the heat of the exploding atomic bombs would be so fierce that it could trigger a nuclear reaction between the nuclei of atoms present in the atmosphere as gasses. The book by Peter Goodchild talks about a reaction between the nuclei of deuterium and nitrogen; while J. Bleck-Neuhaus quotes the fusion of two nitrogen molecules (N-14) to form silicon (N-28), which would be possible due to the energy generated.³⁴ Since roughly eighty per cent of the earth’s atmosphere consists of nitrogen, a rolling barrage of fire would spread out from the site of the first atomic-bomb explosion and encompass the whole of the earth’s atmosphere. J. Robert Oppenheimer, the Scientific Director of the project to develop an atomic bomb, charged Hans Bethe, the Head of the Department of Theoretical Physics at Los Alamos, with estimating the probability of such an event. Hans Bethe was one of the few experts in the world who had a thorough knowledge of fusion reactions. He sounded the all-clear. The project to develop a bomb was continued; the first atomic bomb was tested in New Mexico and the atmosphere was not destroyed in the process. I would really like to know how great the probability calculated by Hans Bethe for this postulated catastrophe actually was, but I have found no information about it in Peter Goodchild’s book. However, Goodchild’s book does mention the results obtained by Arthur Compton’s working group in Chicago, which was involved in the atomic-bomb project. This group estimated that the probability lay at one million to three. This would mean that to have six “right” numbers in the lottery was forty-two times less likely than the destruction of the earth’s atmosphere by the testing of an atomic bomb.

In the following pages I shall leave the human factor to one side and concentrate on the third aspect of the problems caused by nuclear weapons. For my discussion I shall refer to the “lottery” story. The core question is this: have the ever-increasing number of nuclear warheads caused the risk of a war fought with nuclear weapons to grow to unacceptable proportions? In my model I assume that a nuclear war could be triggered by a fault in the “fail-safe system” of a single rocket armed with nuclear weapons. In order to get a feel for what the odds of 13,983,816 to one actually mean, I ask the question about what Erwin must do to be certain of winning the main prize. The answer is that in a single week Erwin would

³³ Peter Goodchild, *J. Robert Oppenheimer. Shatterer of Worlds* (Boston: Houghton Mifflin, 1981), p. 53 and p. 63.

³⁴ J. Bleck-Neuhaus, *Elementare Teilchen* (Berlin: Springer, 2010), p. 102.

have to enter 13,983,816 lottery tickets in a single go, tickets he had filled in very carefully as a different number combination would have to go onto each one. For this Erwin would have to leave fourteen million Euros on the table as his stakes. If Erwin entered only 5,708 tickets his chances of winning would be just under 2,450 to one. Here I have used the number 5,708 which Edward Kennedy and Mark Hatfield gave as that of all land-based intercontinental rockets of the USA and Soviet Union combined.³⁵ If Erwin fills in 46,900 lottery tickets — the same number as there were nuclear warheads in 1982 — then the odds lie at just over 298 to one.

If I take as my starting point the notion that week after week Erwin hands in 46,900 lottery tickets, then according to the statistical mean he will have to wait 5.7 years for “his” numbers to come up in the two-hundred-and-ninety-eighth draw. If Erwin’s numbers only come up after almost fourteen million draws, then 268,920 years will have passed!

This rough calculation says something about the worst-case scenario for the major win on the lottery. The player would set his hopes on the main prize the entire time: if it does not come today it will come tomorrow! On the other hand, in the event of an “accident” with atomic bombs the scenario worked out above would be the most favourable one: the “Big Bang” would come very late. However, with events that have such a low probability no one can predict at what point within the given time-frame the event will occur. This means that generations of people will wake up every morning fearing that catastrophe could strike at some point during the dawning day. Will our successors revere their ancestors in the manner demanded by traditional cults if they know that these ancestors had cooked up this particular broth for them?

For reasons of scientific integrity I have to say a few words about three cases of simplification which would annoy statisticians. In the model I have, to use a metaphor, steered round three “cliffs”. First, in calculating the probable length of the wait for the main prize I have ignored the fact that a particular combination of numbers can crop up twice or even several times within a given period. As a result, one or several combinations might not come up at all within the fourteen million draws and the lottery players who had put a cross beside these combinations would have to wait longer for the main prize than the calculation predicts. If we apply this to the risks of an accident involving nuclear weapons, it means that it cannot be predicted with absolute certainty that an unintentional explosion really must occur during the predicted time-frame.

³⁵ In *Der Spiegel*, 26th April 1982.

Second, I have made an assumption about the “test frequency”. In the case of the lottery there was one chance a week to lay one’s hands on the main prize. Alongside the probability of a grave error occurring it is therefore necessary to state the time-frame in which this event might be expected. I have found no information on the length of time used as a basis for calculating the risks posed by the atomic bombs, but assume that, by analogy with the estimation of risks in nuclear power stations, we may estimate one year. This test frequency is fifty-two times lower than the lottery model, so the period within which a possible, unintentional explosion of nuclear weapons might occur rises from 5.7 to 296 years.

Third, I have assumed that the probability of a fatal failure in the fail-safe system of an atomic bomb is just as great as the probability of having six “right numbers” out of forty-nine. Documents from the United States indicate that “the USA are striving for a figure of less than one million to one for the probability of an accidental explosion”.³⁶ The information is cited here in the same form as in the “Kleine Anfrage” [Small Enquiry] by the Member of Parliament Petra Kelly and the Green faction.³⁷ If we take the probability of one million to one as a basis for the estimate, we have to calculate a statistical mean of every 21.2 years for the unintended explosion of a nuclear weapon.

What do the estimates based on this rough model reveal to us? The very large number of nuclear warheads in existence in 1982 made the risk of a catastrophe being triggered by the technical failure of the fail-safe system in a warhead unacceptably high. The weapon technicians reacted and worked on making the warheads “safer and safer”. In this way they are contributing to our safety; on the other hand, their work has ensured that the total risk for the worldwide system of nuclear deterrence is kept within acceptable parameters. Hand on heart: would the inhabitants of the earth accept an arsenal of almost fifty thousand bombs if every twenty-one years saw the explosion of an atomic bomb in some storage facility or other on the planet? I imagine that in the laboratories for nuclear weapons, in the offices planning the deployment of the weapons and in general staffs estimates of this type are undertaken using elaborate models; and that for some of those responsible the matter has become too hot to handle, with the result that the demand from government circles for a stop to armament also seems plausible.

When I was in California “Murphy’s Law” would be mentioned from time to time: “Anything that can go wrong will go wrong”. Actually, this sentence does not really express

³⁶ Dr. Sparks, Sandia Labs, House Armed Services Committee Hearings - DOE -, Fy 1980, 15 February 1980, p. 156.

³⁷ Printed document of the Deutscher Bundestag 10/2999 dated 12th March 1985.

a law so much as a tautology, “a compound proposition which is unconditionally true for all the truth-possibilities of its component propositions and by virtue of its logical form”.³⁸ If I consider only the things that could go wrong, then it should come as no great surprise that one of the things I have singled out actually does go wrong. One of my colleagues in Berkeley went one better and said that Murphy was an optimist. I asked whether this meant that things which could not go wrong might also go wrong; his response was that this was also one way of looking at it. Of course, this second “Murphy’s Law” is just a play on words. Word games of this sort were evidence of gallows humour and actually make the same statement as the rough calculations I have just discussed. I was also confident that Murphy’s Law could prompt people to remember that the fail-safe systems maintaining the “balance of deterrence” could actually fail, even if they looked very stable at first sight. People were meant to be galvanized into taking action against nuclear armament. Why — in 2013 — do we remain glued to our seats, inactive, when Hans-Dietrich Genscher and Guido Westerwelle, the then-Foreign Minister of the Federal Republic of Germany, demand that we get rid of the last atomic bombs remaining in Germany? We could, at least, support that cause! How few of us are ready to urge our own government to prohibit submarines which can be equipped with nuclear weapons from being exported to Israel.

Basically, the discussion of the technical safety of atomic bombs focussed mainly on one aspect which, in Europe at least, had not been recognized. The probability exists, and should not be neglected, that a country’s “own” atomic bomb — which is, for example, stored in a storage facility for nuclear weapons — could explode due to a technical failure. Even if an incident like this would probably not result in escalation, the explosion itself could be a catastrophe for the country concerned, especially in a heavily built-up area. For a long time it did not occur to me that I could be in danger in my own rented house in Berkeley. Perhaps you can still remember the wonderful view from the deck of this house: San Francisco Bay; the city, which was sometimes shrouded in the fog that blew in from the Pacific; the Golden Gate Bridge, behind which the sun sank into the sea in spring? However, one day the idyllic view of the landscape was spoilt by an American aircraft carrier which had run aground in the middle of the Bay. It was on its way to the port of Oakland, Berkeley’s neighbouring city. An aircraft carrier is a mighty war machine equipped with the most modern weapons, including nuclear weapons, and this machine was stuck for a couple of days. It sat there like a sitting duck for everyone to see. The newspapers in Oakland and San Francisco fell over themselves in their articles. They carried the picture of a dazed-looking captain and wrote

³⁸ *The New Shorter Oxford English Dictionary*, vol. 2 (Oxford: Clarendon, ⁵1993), p. 3228.

about the military bases in Alameda County where nuclear-powered ships were repaired and, probably, atomic bombs stored. If people could see, if people could read, then they were necessarily subject to quite different feelings when looking at the landscape. The poet Gertrude Stein from San Francisco wrote about Oakland: “There is no there there!”. However, in 1982 Gertrude Stein was no longer right: there was “something” in Oakland, in County Alameda, not far from the house in Berkeley where I was living at the time! The older residents of Berkeley remembered that in the war against the Japanese a large number of the supplies had gone through San Francisco Bay. Then, apparently, a large ammunition depot at the north end of the Bay had exploded as well. In my time the grey-painted supply ships from the Second World War, no longer needed, were still rotting in a remote part of the Bay. Since the entire Pacific coast of California does not offer many safe locations for a harbour, military activities, too, are concentrated in the San Francisco Bay.

In the United States, the issue of the weapons’ technical safety turned a new page in the book of problems bound up with nuclear weapons. When I arrived in Berkeley people were already engaged in heated discussions on this topic, one which was new to me. I burrowed my way through the literature available in the library of the Hill Employees. It included some scientifically demanding texts which discussed the issue in the form customary in the Sciences, namely the free exchange of opinions and information. Amongst the documents were official texts from government offices and private handwritten notes by people who, using their scientific tools, had worked their way through to certain insights. On television a programme about Robert Oppenheimer, the “father of the atomic bomb”, presented the idea which had made the building of a plutonium bomb possible in the first place, that of his collaborators Seth Neddermeyer and the famous physicist Edward Teller.³⁹ With time I noticed that the principle considerations on which the building of an atomic bomb was based had their home at the very heart of physics. For example, a differential equation had to be solved which described the diffusion of neutrons through a metal grid. The solution to the equation resembled the way in which freshly brewed tea cools down. All this suggested that the principle behind the functioning of an atomic bomb cannot be concealed from a scientist; and the Secret Service had obviously understood that. Scientists could not, however, be expected to come up with a blueprint for an atomic bomb. The secrets were more likely to be found in the field of engineering.

I soon realized that we needed a discussion about the technical safety of nuclear weapons in Germany as well. It was generally known that the Americans had nuclear weapons in the

³⁹ See Peter Goodchild, *J. Robert Oppenheimer. Shatterer of Worlds* (Boston: Houghton Mifflin, 1981).

Federal Republic of Germany; and there was good reason to suppose that the Russian troops stationed in the German Democratic Republic possessed nuclear weapons as well. Before my flight home to Germany I packed my books, pictures and other papers into a wooden crate and sent them by sea to Germany. In Berlin I found scientists from various disciplines with whom I could discuss the insights I had brought with me from America. One of them penned an enquiry to the Federal Government of the time under Chancellor Helmut Kohl. Petra Kelly of the Green Party submitted it. In its response the Federal Government barricaded itself behind its duty to maintain secrecy and basically ignored the enquiry. I shall go into that in another letter.

All good wishes,

W. Z.

Chapter 5: The Small Enquiry

Berlin, 20th May 2014

Dear Armin,

I was surprised to get you on the phone right away when I rang the number on the envelope you sent me more than twenty-five years ago. You still live at the same address! It is a shame you did not take up my suggestion to talk about old times. By calling you I had hoped to revive the connexion which had so long lain dormant. I find it hard to accept that you have buried yourself in your home and domesticity and refuse to say why you are not prepared to tell the young people of today just how hard you tried to defuse the dangerous situation on the border between the two military blocs, a border which ran right through the centre of Germany. This border, dubbed — using a term coined by Winston Churchill — the “Iron Curtain”, no longer exists in 2014; and the two German states which lay to the east and the west of the border have been reunited into one. The tactical nuclear weapons stationed on German soil in readiness for deployment in a nuclear war have been removed because the armies of Soviet tanks have been withdrawn which these nuclear weapons were intended to stop should these tanks have dared to advance from the Thuringian Balcony through the Fulda Gap and in the direction of Frankfurt am Main. At the time it gave me joy to register how much tact the Russian soldiers displayed when they wrote a goodbye message on the last tanks to be transported back east. Their message was not the standard “Auf Wiedersehen, Germany”, but rather “Fare well, Germany”.

You were part of the movement which worked tirelessly towards averting the danger of a nuclear war in Europe and preserving a habitable country in Germany and Europe for both our generation and the younger people who came after us. We succeeded! We, too, made our small contribution towards leaving behind us a more peaceful and humane world than the one we were ourselves born into. The young people of whom I am thinking grew up in a united Germany. Many may know from their parents’ stories that a border ran through the middle of Germany; they might have heard that the troops of two military blocs confronted one another, armed to the teeth; and only a few will have heard of the nuclear weapons which stood in readiness on both sides of this border. In public, in politics and in the press people talked and wrote about a “Cold War”. It is possible that the young will not believe any of this and simply dismiss it as the pomposity of the elderly. However, we know that these lines

described the situation in which Germany found itself in the 1980s. If young people wish to delve more deeply they will have trouble, in a united Germany, in reconstructing the course of the former border. To facilitate their search we could hand them the book by J. Ritter and P. J. Lapp, *DEUTSCHLAND GRENZENLOS. Bilder der deutsch-deutschen Grenze. Damals und heute.*⁴⁰ In any case, though, we should not forgo the passing on of our experiences, even if we are forced to talk about our failures. In 1985 the then-Federal Government under Helmut Kohl dished up such a failure when it did **not** answer the “Small Enquiry” which you had written, citing its duty to maintain secrecy. That is how I see things and that is the subject of this letter.

I clearly remember how I met you for the first time. You had taken over a lecture on rocket technology in the seminar organized by a colleague of mine. He had had the idea of opening up the seminars on nuclear physics at the Hahn-Meitner Institute to discussion of the problems caused by nuclear weapons. This colleague asked me whether I could talk about “the technology of atomic bombs” at one of the first seminars in the series. When he told me that experts on nuclear physics had already accepted his invitation to speak and would describe the problematic situation in which Germany found itself from the perspective of their own areas of expertise, I, too, accepted. You were one of these experts. Despite the cold feet of the Institute management at the time, the seminar took place within the context envisaged for it.

For me the seminar came at exactly the right moment. It was attended by people who listened to me when I reported on my experiences in the United States in the early 1980s. At the time such attention could not be taken for granted everywhere in the Federal Republic of Germany. In the eyes of many Germans the USA had, with the NATO Dual-Track decision, ushered in a new round of the nuclear arms race; and when it emerged that a new weapon was to be deployed in Germany alone, namely the Pershing II missiles, mistrust of the American government had grown to immense proportions. This mistrust was directed at me, too, when I spoke about the people in America who were, just like us, campaigning vehemently for a reduction in the arsenal of nuclear weapons. In the years mentioned above I had been active in Berkeley, California, as a member of the group Hill Employees for the Nuclear Weapons Freeze, which had its home at the Lawrence Berkeley Laboratory, where I was doing my research. In America I had learnt a great deal about nuclear weapons; I had collected documents and sent them to Germany; and I was burning to pass on something of my experiences. However, for a long time I was not successful. Two old “friends from the peace

⁴⁰ Berlin: Christoph Links, 2014.

group” looked at me critically and asked: “So, those people over there have turned you, I see?”. I was not given a chance until some people who had taken part in the seminar decided to continue working together. We agreed that we would try to make the problem which was so hotly debated in America — the safety of atomic-bomb technology — into a topic in German politics as well. You suggested using your connexions to Petra Kelly and formulating a “Small Enquiry”, addressed to the Federal Government, which could be submitted by the Green faction. We thought the idea was a good one and you composed a text with seventeen questions on which I would like to concentrate in this letter. The Federal Government’s answer came on 12th March 1985 and was disappointing. The Parliamentary Secretary of State at the Ministry of Defence retreated behind his duty to maintain secrecy. The Greens — and we, too — did not pursue our enquiry and hence the whole campaign would have run aground if — quite independently of us — the German section of the International Physicians for the Prevention of Nuclear War (IPPNW) had not probed more deeply into the subject. I remember that you reacted to the Federal Government’s response with calm detachment. You simply shrugged your shoulders and said: “What else can you expect from bureaucracy!”. The government’s response was obviously in keeping with the normal routine in the world of politics. I heard similar sentiments expressed by other people. “There are worse things”, is something else I heard whenever I made a fuss. However, I do not intend to let the matter drop and today shall pick up on the Federal Government’s reaction to the “Small Enquiry” once again. In my opinion it is high time we made clear to the next generation the huge size of the burden placed on our shoulders by the invention of the atomic bomb; and I also think there must be young people who do not shirk from tackling the insanity of nuclear armament. A librarian helped me to find the dossier in the Bundesarchiv [Federal Archives] and to print out a copy for myself. I shall type out the original printed document so that its subject matter is clear to everyone who can read. At this point I plunge into the rather dry, dull world of political language. Even though it might become boring I must present the authentic documents for readers’ information.

The heading above the Federal Government’s response to the “Small Enquiry” runs as follows:

German Bundestag

Printed Document 10/2999

10th Legislative Period

12.03.85

Response by the Federal Government

to the Small Enquiry by the Member of Parliament Frau Kelly and the faction THE GREENS

— Printed Document 10/2897 —

Quantitative Security Analysis of Atomic Weapons

Then it continues in the rhetoric customarily employed on the political stage:

With his letter of 8th March 1985 the Parliamentary Secretary of State at the Federal Ministry of Defence has, in the name of the Federal Government, answered the Small Enquiry as follows.

Then the questions are presented just as you had formulated them:

1. Can the Federal Government confirm the statement by the US Department of Energy that a nuclear fission bomb of the usual construction consists of a plutonium sphere in a concentric shell of traditional explosives (DOE, Samuel Glasstone and Philip J. Dolan, *The Effects of Nuclear Weapons*, U.S. Government Printing Office, 1977)?⁴¹
2. Can the Federal Government confirm the statement by the US Department of Energy that an atomic explosion is triggered by the precisely simultaneous ignition of the explosive shell compressing the sub-critical plutonium sphere to a super-critical density; and that subsequently an additionally precipitated neutron shower initiates the chain reaction leading to the liberation of energy (DOE, Samuel Glasstone and Philip J. Dolan, *The Effects of Nuclear Weapons*, U.S. Government Printing Office, 1977)?
3. Can the Federal Government confirm the statement by the Secretary of the United Nations that a nuclear fission bomb of the usual construction contains roughly four to eight kilogrammes of plutonium (UN, Report of the Secretary-General, Nuclear Weapons, 1980, Annex, p. 11)?⁴²

The Secretary of State answered these first three questions in two short sentences:

The details of the construction of nuclear weapons constitute classified information. Thus the Federal Government has no comment on these questions.

The book by Glasstone and Dolan (see above) played a particular role in the formulation of the Enquiry. The book is a publication by the US Department of Energy (DOE) and may be regarded as an official statement by the American government. I would have been satisfied if the Parliamentary Secretary of State had indicated that the “Federal Government” was aware of this book. However, he merely cited his duty to maintain confidentiality. Why must the

⁴¹ Available at: <http://www.deepspace.ucsb.edu/wp-content/uploads/2013/01/Effects-of-Nuclear-Weapons-1977-3rd-edition-complete.pdf>.

⁴² Available at: file:///C:/Users/annes/Downloads/A_35_392-EN.pdf.

Federal Government keep secret something that is discussed in public in the United States? To this very day it still annoys me that we were brushed off so insolently.

Now I shall cite questions four to sixteen from the Enquiry:

4. Can the Federal Government confirm that the following dangers exist in the case of an accident with a nuclear warhead:

a) The detonation of the chemical explosive can lead to the destruction of the atomic system and hence to the liberation of plutonium, probably in the form of a fine plutonium dust;

b) The unintentional arming of the warhead can lead to a nuclear explosion?

5. Does the Federal Government share the concern of US Secretary of Defense Weinberger, who observed with regard to nuclear weapons: “In particular, we need always to be mindful of the danger of accidents and unanticipated failures, both human and technical” (DOD, Annual Report to the Congress, Fiscal Year 1983, p. I – 19)?⁴³

6. Can the Federal Government refute the report that the US government is concerned about the dangers caused by accidents with the battlefield nuclear weapons in the Federal Republic of Germany; and that, in accordance with a special programme of the US Department of Defense, “The vulnerability of the warheads to accidental detonation or terrorist exploitation must be minimized” (U.S. Department of Defense, Annual Report to the Congress, Fiscal Year 1981, p. 146)?⁴⁴

7. Can the Federal Government confirm that the USA are aiming at a figure of less than a million to one for the possibility of an explosion due to an accident (Dr. Sparks, Sandia Labs, House Armed Services Committee Hearings – DOE –, Fy 1980, 15th February 1980, p. 156); and that the quantity of circa five thousand nuclear warheads stored in this country has to be taken into consideration when calculating the total probability of an unintentional nuclear explosion in the Federal Republic of Germany?

8. Can the Federal Government confirm that the figure aimed at by the USA as the greatest probability for an unintentional atomic explosion of a nuclear weapon — namely, one million to one — is higher by several orders of magnitude than the probability of a catastrophe asserted in the Federal German safety analyses for installations with atomic technology?

9. Can the Federal Government confirm that the safety and ignition mechanisms of the Pershing II rockets and cruise missiles use micro-computer elements in order to activate the bomb only after a series of external events (amongst others, acceleration) have occurred?

⁴³ Available at: http://history.defense.gov/Portals/70/Documents/annual_reports/1983_DoD_AR.pdf?ver=2014-06-24-150929-423.

⁴⁴ Available at: http://history.defense.gov/Portals/70/Documents/annual_reports/1981_DoD_AR.pdf?ver=2014-06-24-150845-130.

10. Can the Federal Government confirm that not even the manufacturers of bombs can compile a quantitative safety analysis for modern nuclear weapons, amongst other reasons because it is fundamentally impossible to determine the reliability of the micro-computer programmes (software) in the electronically controlled safety and ignition mechanisms of the bombs?

11. Can the Federal Government refute the statement by the US Department of Defense that military software is a “double-edged sword. It can cause our future military systems to fail in a way that would be catastrophic for our national security. There is a high probability of such critical errors because software technology is a field still in its infancy” (Department of Defense, Software Technology for Adaptable, Reliable Systems (STARS) Program Strategy, Washington, 15th March 1983)?⁴⁵

12. Can the Federal Government refute the observation that it is not in a position to state the size of the potential danger of an accident involving the foreign nuclear weapons stationed on the soil of the Federal Republic of Germany?

13. Can the Federal Government confirm that it has available to it quantitative safety analyses for the civilian installations using nuclear technology in the Federal Republic of Germany but that similar quantitative safety analyses do not exist for nuclear weapons?

14. Can the Federal Government confirm that a civilian installation with nuclear technology may not be constructed, embedded or operated in the Federal Republic of Germany if its safety hazards are as unknown as they are with nuclear weapons?

15. Can the Federal Government confirm that plutonium is combustible and in the case of its liberation in accidents caused by explosions or fire very probably finds its way into the environment in the form of a fine dust of plutonium oxide?

16. Can the Federal Government confirm that the majority of accidents involving nuclear weapons in which radio-active materials are liberated take place after the transportation of nuclear weapons?

Questions 4 to 16 were again graced with a joint answer:

In accordance with the Nuclear Non-Proliferation Treaty the Federal Republic is not developing any nuclear weapons and also has no such weapons at its disposal.⁴⁶

With regard to the safety of these weapons the Federal Republic does, however, work closely with the American government, with which it constantly exchanges information. **Since the results of this exchange of information are also classified, no answers can be provided to the questions which have been posed.**

⁴⁵ This is translated from the German as the original could not be found online.

⁴⁶ The German is ambiguous and could also mean the Federal Republic of Germany owned no nuclear weapons.

However, it can be stated that the safety standards for nuclear weapons are by no means lower than those for civilian installations with nuclear technology.

For me the fourth question is central to the entire enquiry. In simple words you stated that we must be concerned about the technical safety of atomic bombs. With the first part of the question (4a) you went into the situation of the atomic bombs present in Germany. You make it clear that in a “minor accident” which does not result in a nuclear explosion major damage can nonetheless arise due to contamination through the highly toxic and radioactive element plutonium.

The last question runs:

17. Can the Federal Government confirm that an essential part of its duty of care consists in not permitting any technical sources of danger on the soil of the Federal Republic of Germany which might expose its population to unknown hazards?

This question is worded very provocatively, with the result that the Secretary of State answered it separately: “The Federal Government takes its entire duty of care very seriously”.

In the text you pose seventeen questions. Some of them begin with the phrase “Can the Federal Government confirm [...]?”. In my opinion this sentence alone should have signalled to the Federal Government that the “Small Enquiry” was intended to initiate an exchange of ideas. The “Small Enquiry” was meant to point out the threats posed to the population of the Federal Republic of Germany by the technical failure of nuclear weapons. With our Enquiry we did not exceed the framework put into place for Germany and we concentrated on the technology of the Pershing missiles, which we suspected was not yet fully developed. At this juncture we did not address the other topic dear to my heart; and hence the government of the Federal Republic of Germany did not learn from us that people in the United States were discussing whether the entire population of the world was exposed to an unacceptable risk through the stockpiling of a huge arsenal of nuclear weapons. We knew that influential individuals in the governments on both sides of the Iron Curtain knew about this global problem and so thought that the government of the Federal Republic of Germany could not be completely clueless. Were we mistaken? There was also a good reason for our Enquiry at the time. In January 1985 “three American soldiers” died when “the engine of a Pershing II rocket stage was destroyed by fire” near Heilbronn. The source continues: “In a preliminary interim report [1a] by the US board of enquiry and the Federal Minister of Defence a phenomenon previously unknown to Physics [1b] was given as the only plausible explanation of this accident”. The text cited here is taken from the second impression of the pamphlet

Plutonium, Medizinischen Folgen eines atomaren Pershing II-Unfalles [*Plutonium. The Medical Consequences of an Accident Involving an Atomic Pershing II*], published by the Federal German section of the International Physicians for the Prevention of Nuclear War in November 1985.⁴⁷ It lists the sources: [1a] Federal Minister of Justice, written reply dated 6. 5. 1985, Az. 9270/17 II – 563317/85; [1b] Federal Minister of Defence, Inquiry Report on the Pershing II missile accident in Heilbronn on 11th January 1985, press communiqué XXII/24 from 24. 4. 1985, pp. 1f..

From the same pamphlet by the International Physicians for the Prevention of Nuclear War I learnt that at the time questions about nuclear armament were passed around like a hot potato by members of the Federal Government. Obviously the Enquiry to the Federal Government was ultimately passed on to the “Parliamentary Secretary of State at the Federal Ministry of Defence” and thereby elevated to the level of politics. However, I am not sure whether the Secretary of State wrote the answer personally or whether one of his assistants was forced reluctantly to pick up his pen and found it easier just to reach into the readily accessible pigeonhole where the “Top Secret” stickers were stored. I had not expected that a Member of Parliament would be able to draw on his own knowledge to answer the questions. I took it for granted that in the background there would be a working group which possessed expert knowledge of technical issues. Therefore the response to the “Small Enquiry” might have been written by an associate from a different office who simply wanted to have some peace from the “Greens”, a party which had newly arrived in the Bundestag. In this context a story comes to mind that was related to me by one of my former colleagues. He had drafted an enquiry for a Member of the Bundestag and days later this enquiry landed back on his desk so that he might compose a response! In response to the first three questions we might have written — on behalf of the Federal Government — the following to Petra Kelly:

Dear Frau Petra Kelly,

Do you actually believe that we do not know how to read? We have had the book by Glasstone and Dolan mentioned in your Enquiry in our library since 1977. We have frequently leafed through it; and besides that we are also constantly kept up-to-date by our American friends. We can understand the concern about the technical safety of the atomic bombs stored in Germany. We, too, are concerned that the unforeseen explosion of an atomic bomb could occur. We see a particular risk in the atomic bombs of the Soviet Union, about whose technical fail-safe systems we unfortunately know very little. However, your concern is unfounded when it comes to the American

⁴⁷ Address: Bahnhofstraße 24, 6501 Heidesheim.

bombs since our American friends assure us that they are doing everything in their power to avoid the unintentional explosion of a bomb. We have one request of you: do not ask us questions about technical matters when you already know the answers! After all, you too can read the book published by the Department of Energy.

You will raise the objection that the “Parliamentary Secretary of State at the Federal Ministry of Defence” would not have possessed a sufficient sense of irony to issue such a reply. Under the government of Federal Chancellor Helmut Kohl “riding things out” was the order of the day and not “skirmishing” or “embrace”. We were naïve if we thought we could cut any ice with the Federal Government by providing them with the information that the technical safety of nuclear weapons and their launch systems was being discussed by the advisory bodies of the American government. From Helmut Kohl’s vantage point on his high horse we were too small. The tactic of the inclusive embrace only became fashionable under other Chancellors.

To this day I remain annoyed that the Parliamentary Secretary of State had such an easy time with us. He had the audacity simply to shove us to one side! The answers to our questions were simply not secret any longer! For example, as early as the summer semester of 1982 the Department of Physics at the University of Marburg had put on a seminar about “Aspects of Developments in Armament Technology from the Perspective of Physics” which went into the “basis in Physics for, and the history of the construction of, the first nuclear weapons”. The lectures from the seminar were published in the series “Physik und Rüstung” [Physics and Armament]. I myself purchased a copy of the third, revised and extended edition (1983) from a bookseller’s. Knowledge about the construction of atomic bombs had also become available in the English-speaking world through a seven-part series about Robert Oppenheimer screened by the BBC. I bought the book by the journalist Peter Goodchild that accompanied the film, *J. Robert Oppenheimer. Shatterer of Worlds*.⁴⁸ These books and further documentaries taught me that no secret documents are necessary for an understanding of the basic operation of an atomic bomb. Physics textbooks and a couple of reflexions on the logic of Nuclear Physics are perfectly sufficient!

The Federal Government also inflated its own importance. In its response it gave no indication that the Federal Republic of Germany was not a sovereign nation. Even if more than thirty-five years had passed since the end of the Second World War, the Allies still exercised special rights in the Federal Republic of Germany and could at any time express reservations about actions or policies planned by the German government. I remember a function at which a lawyer explained that the German authorities were not, for example,

⁴⁸ Boston: Houghton Mifflin, 1981.

permitted to check the technical safety of the American military vehicles travelling on normal roads (no TÜV!).⁴⁹ He said that American military vehicles with worn tires had been on the move and involved in accidents with German vehicles. The German Federal Government leapt in to settle the claims for damages. You touched a nerve with your Questions 12 to 14 especially. The Federal Government may have been able to set the safety standards for nuclear power stations but it had no say in the safety of nuclear weapons. Federal Chancellor Helmut Schmidt always spoke of the NATO Double-Track Decision whenever he had to justify the deployment of the Pershing II missiles. The United States were the leading power in NATO and it was the American government which made the decisions about the development and deployment of nuclear weapons. Helmut Schmidt was aware of the limits on his scope for political action and must have suffered under them. Did you recently see how happy Herr Schmidt looked when he was able to celebrate his ninety-fifth birthday surrounded by the politicians who were in power at the time? When the response to the Small Enquiry was written, Federal Chancellor Helmut Kohl obviously did not want to abandon the illusion that he played a more important political role than those who had awarded him office. However, “history” was later very obliging to Helmut Kohl: from 1990 onwards he had his grand gigs. At the so-called Two Plus Four negotiations, which he exploited to maximum theatrical effect, he sat at the same table as the “Greats” and could achieve full sovereignty for the Federal Republic of Germany, then extended by the territory of the German Democratic Republic.

In order to uncover a further explanation for the peculiar behaviour of the German Secretary of State I re-read an article by Roger Molander which had appeared in the United States in the journal *Tribune/TODAY* on Sunday 28th March 1982. Molander had been a nuclear strategist for the National Security Council, advising the American president on strategic matters and the deployment of nuclear weapons. In the article he wrote about his experience working for a defence think tank for the Pentagon. I assume that there was also a group responsible for strategic planning in the German Ministry of Defence which operated along the same lines as the think tank in America. After leaving the service of the American government of his own accord, Roger Molander became President of the group Ground Zero, which wanted to enlighten the population of the United States about the consequences of a nuclear war. Molander reported his horror at how little expertise the advisory boards exhibited when it

⁴⁹ The TÜV is a certificate from the Technischer Überwachungsverein [German Association for Technical Inspection] which attests to the roadworthiness of motor vehicles.

came to matters connected with nuclear armament. Ground Zero published the book *Nuclear War: What's In It For You?*.⁵⁰

For a long time I asked myself how the “peace groups” in Germany got hold of the information on the planned deployment of nuclear weapons in Germany and were, with this material, able to embark upon the massive education of the German population. You, too, did your bit to contribute by organizing sessions on the topic throughout Germany and tirelessly pointing out the dangers of the newly installed Pershing II missiles. Did you have the impression that much information was published as “material for games” in order to influence the opinion of the general population?

Today shivers still run down my spine when I think we may well have been fed the timetable for the route to the Third World War — this time with the far-reaching deployment of nuclear weapons. In your Question 5 you quote the then-American Secretary of State for Defense Caspar Weinberger, who had said that people “had to be aware of the danger of accidents and unexpected errors, both human and technical”. Weinberger may have played down the matter somewhat when he spoke of “human error” in the above statement. However, there have been many wars which started thanks to errors of judgement, have there not?

During those years I relied on the two military blocks and their “leading powers” — the United States on the side of the West and the Soviet Union on the side of the East — having some sense of rationality and mortal danger when they were threatening each other with long-range missiles. During a conflict the bombs were to be guided to their targets along ballistic trajectories. The flight trajectories were long enough for the missiles to be recognized on their approach. There was, then, still sufficient time for the other side to guide its own missiles onto ballistic trajectories in order to destroy the programmed targets in the aggressor’s territory. In the official interpretation by the military strategists, the military potential was in balance, thereby resulting in a balance of “terror” which would deter the current opponent from an attack with nuclear weapons. The balance of “terror” was preserved for as long as none of the adversaries had the capacity to intercept its opponent’s missiles. With his **Strategic Defence Initiative (SDI)** Ronald Reagan called this thinking into question. Research into missile interception systems was to be paid for with the money made available by this initiative. There was also some thought of atomic bombs which were ignited in the upper atmosphere in order to render the opponent’s surveillance systems inoperative by means of the bombs’ “electro-magnetic” impulse. The slogan for this initiative, which was

⁵⁰ New York: Pocket Books, 1982.

borrowed from the film industry, was “Star Wars”. The huge weapon laboratories and manufacturers naturally put up their hands straightaway in a bid to lay these hands on the additional funding. It was this initiative which really unsettled me at the time. However, somehow the SDI ran into the sand.

Hence for us “naïve physicists” the affair with the Federal Government was a washout! We were more successful with our second objective, the education of the population. I believe we managed to teach people that there was no need to love the atomic bomb, but that it was, on the contrary, much better for one’s health not to have any in one’s neighbourhood. In my opinion the population understood this at the time and have not forgotten it to this day. What, however, is the situation amongst the young people of today, who were not there at the time? I see them on public transport, sometimes on their mobiles for lengthy periods or staring spellbound at the screens of their portable computers. They are much more competent at using these electronic devices than I shall ever be, but are they aware of the danger of “imprisonment in the net”?

On page 52 of the weekend edition of the *Berliner Zeitung* from 17th/18th May 2014 there was a report bearing the heading, “In Love with an Atomic Bomb”. The sub-heading provided the information that in Munich “awards had been given to the best computer games”. Amongst the winners was a game called CLARC, which had been developed in Berlin. The article went on to report that “this year the prize was being awarded by the industry associations BIU and G.A.M.E. and by the Federal Ministry for Transport and Digital Infrastructure; it was being awarded for the sixth time in all”. The Federal Minister then in office, Alexander Dobrindt (CSU), said in his *laudatio*:

The German Prize for the Best Computer Game is a major distinction in the German media landscape. It enjoys the same status as the German Film Prize or the Echo Music Prize. It is our goal to use the Prize to promote games of high quality and cultural value and to make the achievements of the games industry known to a broader public.

The report continues:

The award for the best mobile game went to the App CLARC, a sort of digital puzzle in which a robot stomps through a rusty, decaying industrial landscape and has to perform tricky tasks. For example, he has to save components from trigger-happy androids in order to help the atomic bomb Clara, with which he has fallen in love.

I find it cynical and manipulative when the military-industrial complex smuggles product advertising into games classified as harmless and “of high quality and cultural value”; and I find it morally reprehensible when a current Federal Minister for Transport and Digital Infrastructure is prepared to promote such a game. The same article also records that two trade journalists, who are named by name, had announced their resignation from the expert panel because the introduction of the special category of a Jury Award for games with the age rating USK 18 would treat adult games with high-quality graphics but violent content as a “second-rate cultural asset” — instead of comparing them on an equal footing with all other games.⁵¹ What, exactly, are the two trade journalists complaining about? You are simply forced to read this passage twice! They are demanding that computer games with “violent content” be classified as “first-class cultural assets” if they have “high-quality graphics”!

The game of strategy *Fulda Gap*, which originated in the United States and in the 1980s was also available in Germany, is not to be regarded as having “high-quality graphics” by today’s standards. It was a board game with counters and quite simple in its execution. I was told that the game was played on a field laid out to resemble a map of the area around the city of Fulda. The ranges of hills and the rivers, the villages and the small towns were correctly located where they lay in the topography of the landscape and on the board they bore their real names. That was the landscape for a “battlefield” on which the troops of two adversaries were meant to carry out their manoeuvres. The players could decide whether they wanted to deploy conventional and nuclear weapons. When I first heard about the game, people reported that it was being played by the soldiers in the garrisons of the American Forces stationed in Germany. Obviously they were meant to practise the strategies for repelling an assumed Soviet attack. With time the game found its way into the hands of the soldiers in the German Bundeswehr [Armed Forces] and then reached the inhabitants of the Hessian Central Uplands (hessisches Mittelgebirge). When the latter played the game *Fulda Gap* they discovered “playfully” what a “nuclear war meant for them”. If they “played out” to the bitter end the escalation built into the game, then everything worth defending was destroyed. Not a few people in the world feared that the Third World War, which would be fought with nuclear weapons, might begin in the Fulda Gap in the 1980s. However, our guardian angels were watching over us Germans and once again we escaped!

At the time I tried to buy this game in Germany but it was not for sale in the toy shops. When I enquired in the appropriate shops during a trip to America, they no longer had it in stock. I was offered a game of strategy similar to the *Fulda Gap* in which the field consisted of

⁵¹ *Berliner Zeitung*, 17th/18th May 2014, p. 32.

abstract grid squares and did not permit any associations with any landscape in Germany. When I subsequently played on this abstract board, I noticed that I could only approximately recreate the emotional strain to which players were exposed when they destroyed grids bearing the names of their home town or village. At the time a tape was circulating in the circles of the “peace movement” on which were recorded the conversations of two players during a game of *Fulda Gap*. One of the situations in the game has remained in my memory. The player whose turn it is initially hesitates to deploy an atomic bomb in order to defend himself against his opponent’s attack, but then drops it on the town of Schlitz (in Hesse) after all. You can hear the noise of a chair being shifted back and then a voice saying, “That is enough! I have just destroyed my home town!”.

I was also told that in the barracks of the German Bundeswehr many a German soldier who was close to a nervous breakdown also abandoned the game prematurely: gradually and without a fuss *Fulda Gap* was withdrawn from circulation since the German Army’s defence readiness suffered too badly. It was not the “high-quality graphics” of slaughtered monsters and desecrated virtual landscapes which conjured up the idea that nuclear weapons must not be deployed; rather, the people who could imagine a nuclear war came to hold this opinion — and did so without any virtual aids.

Regards,

W. Z.

Meditations: Afterthoughts for a Finale

Berlin, 20th February 2017

and 6th March 2017

After reaching the decision in February 2017 that I would publish the first five chapters of the book I was writing as an independent book and part of a trilogy, and after re-reading these five chapters, I sensed that something was missing. I was alarmed at the situation in the United States after its presidential elections had seen, in the form of Donald Trump, a man come to power who, in my view, was far too close to the “red button” which could trigger a war with nuclear weapons. With the President’s loose-tongued speeches, which did not sound like those of a responsible statesman, came first confusion and then a sizable dose of panic. It seemed to me that the time had come to make public the arguments contained in the five letters in this book and to do so immediately, even urgently. Moreover, I found that in view of the then-current situation I would have to add something to the already completed manuscript. I did not want to write about the things I planned to present in the chapters still to come after the first book. Hence I considered subjects which I had already “weeded out” and which suddenly became frighteningly topical. “There is no time to lose”: this thought seethed inside me and thus a “finale” suddenly surfaces at the end of this volume.

If we take one of Donald Trump’s slogans seriously — and I could list plenty of reasons for not doing so — and for once assume that his battle cry “Make America Great Again!” represents more than just an advertisement for a washing powder designed to remove stains from waistcoats, then we are immediately faced by the question: “When was ‘America’ great?”. Since Donald Trump has a preference for the vague and woolly, he has yet to point out to us where and when “Great America” may be found. Hence I have the freedom to indulge in a little archaeology, digging into the soil of history. Will my excavations uncover “Great America”?

In March 2017 I was somewhat over seventy-two years old. That is an age at which many men embark on their biographies, even without a direct cause. As long as I have been alive the United States of America have not been small, or so I found when I journeyed back into the past following the thread of my memories. What occurred to me in response to the

question about a “great America” were the 1950s, when Dwight D. Eisenhower was President of the United States. Eisenhower had ordered US troops into battle against a Germany then ruled by the National Socialists. It was not only the author Stefan Heym — who had fled Germany, gone to the USA and had thence returned as a soldier in the US Armed Forces — who linked the war against a barbaric Germany with the Crusades;⁵² and at that time democratic America was held in the highest esteem by the whole world. At Easter 1950 I had started school at the primary school in Hermannsburg (district of Celle) and from then on learnt a great deal about democracy and liberty from the American model. Now and then I also heard the tones of American swing drifting over to me if my father put on a Benny Goodman record. I sucked on the sweets which my mother dished out to me from the care packages sent by Aunt Leona in Wisconsin. We were happy to have escaped the Soviet Zone and had officially been recognized as refugees from the town of Brandenburg on the Havel, a town which for the native population of Lower Saxony lay “somewhere far off in the East”. I still have my refugee identity card for Number A 291 626, which was issued on 1st July 1949. I recently found it in a pile of old Post Office savings books and old international driver’s licences. At the time all the members of my family were convinced that this time we were on the right side. My parents shook off their memories of the Nazi period by sunning themselves in the reflected glory of America. I joined them. In those days I thought that New York was the capital of America since the most glittering glamour shone out from there. This is what I remember as being the age of America’s greatness! Timothy Snyder who as Professor for History at Yale University and Permanent Fellow at the Institute for Human Sciences in Vienna is an expert in this field, also opts for the 1950s.⁵³ He gives the following answer to the question, “What does Trump stand for?”:

He [Trump] speaks the language of the 1930s. If people talk about the enemies of the people, about America first, then those are almost quotations from the 1930s. If anything can be learnt from history, then it is what concerns people who express themselves in this way. That is the fundamental question for the American political system. The nostalgia felt by Americans is for the Fifties. However, there is already a difference — a very important one — when the nostalgia is felt for the Thirties, that is, for an America where there was no affluence, no Second World War, an America which was very far to the right, isolationist etc.

⁵² See *Der bittere Lorbeer* (Munich: Bertelsmann, 1989); original version: *The Crusaders* (Boston: Little, Brown, 1948).

⁵³ *Frankfurter Rundschau*, 13th March 2017, p. 20.

With the nostalgia for the 1950s comes the memory of winning a competition for the best insult. This competition took place on the school playground during breaks between classes. My classmates knew better insults; and “coward”, “wimp” and “mummy’s boy” were winning by a mile when I randomly threw the word *Hasardeur* [gambler; chancer] into the ring. My playmates were taken aback: “What is that, a *Hasardeur*?”. I replied that my grandfather had told me Hitler had been one. “You’ve won!”, came the response. It was only much later that I learnt that a *Hasardeur* is a soldier of fortune or opportunist; and that when applied to Hitler was a form of flattery which made him appear harmless rather than a real term of abuse. Recently the almost-obsolete word *Hasardeur* could once more be read in the newspapers, indeed on several days!

Timothy Snyder skilfully avoided a direct comparison between the language of Donald Trump and that of Joseph Goebbels, Propaganda Minister of the Third Reich. For me, a German, this comparison is unavoidable since I translate “enemies of the people” not with “Feinde des Volkes” but rather with “Volksfeinde”, an item of vocabulary from the *lingua tertii imperii*, the language of the Third Reich. The philologist Victor Klemperer described and analysed the *lingua tertii imperii* in his book *LTI. Notizen eines Philologen*.⁵⁴ When I bought Klemperer’s book in the Nicolai Bookshop, the bookseller immediately gave me the names of two more authors who devote their attention to the same topic. Harry Belafonte has grown old; he needs a wheelchair to get around; and his voice has become shaky and cracks. Recently he was in a church in New York and said a few words. The last words of his lecture were: “Welcome to the Fourth Reich!”.

When I was at school we dealt with the Roman Empire twice in our lessons: once in History, where it was part of Classical Antiquity; and then in Latin, where discussion of the Roman Empire was self-evident. The text books included an appendix with a map of the Roman Empire at its most extensive; and these books contained a photograph of a statue of the first Roman Emperor, who called himself Augustus but was really called Gaius Octavius. As we can glean from the Latin-German dictionary known as *Der kleine Stowasser*,⁵⁵ the name “Augustus” is accompanied by terms such as “radiance”, “sacred” and “sublime”, whereby Augustus is a better name for a sole ruler than Gaius Octavius. In school we learnt that the origin of this enormous Empire was the city of Rome; sometimes its beginning was the furrow in a ploughed field, a furrow ploughed by Romulus; in both cases time brought with it an unbroken chain of wars in which one piece of land after the other was conquered and added to

⁵⁴ Stuttgart: Reclam, 2016; first published: Berlin: Aufbau, 1947.

⁵⁵ Munich: Freytag, 1960, p. 8.

the Empire. When the emperors ascertained that the Empire had grown too large, they divided it into two parts (285 AD). These crumbled over the centuries, the Western Empire faster than the Eastern Empire. Under Augustus the undivided Empire was absolutely huge. When it was due to expand still further, it experienced its first bitter setback. The Romans failed to conquer Germania when several legions of the Roman army were completely destroyed near Kalkriese (in the vicinity of Osnabrück) in the Battle of the Teutoburg Forest. Since pupils in all European and American schools were probably given the same yardstick for “greatness”, discussion of whether a country can be called “great” whose greatness is not based on military superiority is simply rendered redundant

Since history teaching followed the chronology of events, the Roman Empire was dealt with as the second topic in Classical Antiquity, immediately after the empire of Alexander the Great. In Latin classes, too, our path did not skirt round the military triumphs of the Roman Empire, because the curriculum of the *Kleines Latinum* [Intermediate Proficiency in Latin] included *De Bello Gallico* by the military leader Gaius Julius Caesar. The education authority which, of all things, selected for reading in class the reports by a military commander sent to the Senate in Rome must have been mired in prejudice. Pupils were meant to learn Latin by studying the text of the *Gallic Wars* and to practise the language of Ancient Rome. But why on earth was the dead-boring text written by a soldier preferred to the poet Ovid’s *Metamorphoses*?

During our stay in California we had made friends with Maria, who came from Rome, was married to an American and like us lived in the hills of Berkeley. She had decided to become an American citizen and was prepared to renounce her Italian citizenship to do so. Maria told us she was diligently working her way through the mandatory twenty-five lessons in citizenship in preparation for the exam. She could only become an American citizen if she passed this exam. She was the one who drew my attention to the ninety-five-page booklet from which she was gleaning her knowledge of the American nation.⁵⁶ Here I introduce the twenty-second lesson in this booklet as the first of the documents which I had discarded. This lesson deals with ‘Our Country’s Wars’. After the introductory sentence “The United States has been engaged in the following wars”, we are presented with the following list:

1. The Revolutionary War, 1775–1783.
2. The War of 1812, 1812–1814.
3. The Mexican War, 1846–1848.

⁵⁶ D. L. Hennessey, *Twenty-Five Lessons in Citizenship*, 91st edn (Sausalito: Monosoff, 1981).

4. The Civil War, 1861–1865.
5. The Spanish-American War, 1898.
6. World War I, 1917–1918.
7. World War II, 1941–1945.

The chapter is concluded by the undeclared wars “The Korean Conflict” and “The Vietnam Conflict”.

The first six wars are dealt with very schematically. After the name of the war the following information is given in four lines: 1. the countries involved in the war (“Countries Engaged”); 2. The reason for the war (“Cause”); 3. The outcome (“Result”). In Line 4 the leaders are listed. The leaders are the presidents of a country, the emperors and generals. The Second World War is dealt with at greater length: two very detailed pages are devoted to it, mainly about the war against Japan.

I was particularly interested in learning about a Californian author’s view of the First World War. I knew that in all the countries which had suffered badly the First World War was seen as a major caesura in their cultural development and as a terrible catastrophe. Many village churches in England, France and Germany have plaques on their walls listing the names of the young men who came from that community and fell in the War. The trench warfare, the deployment of machine guns, tanks and poison gas left traumatic traces in those who came back from the War. Whenever we wanted to explain to our American friends what sort of country we came from, we soon arrived at this war, which had carved up our culture: after the War nothing remained where it had originally belonged; on pictures from the period heads are separated from torsos are separated from limbs; and in music harmony was drowned out by disharmony. After the War the search was on for the one guilty person who could be held responsible for the entire carnage. Clémenceau, President of the French Republic, pointed to the German Emperor Wilhelm II and possibly to some extent to the German General Ludendorff and the physicist Max Planck as well. He did not point his finger at the young Serb who had ignited the powder keg by shooting the heir to the throne of the Austro-Hungarian Empire. He was too insignificant. The peace treaties failed to achieve a lasting peace. The lament of a man born roughly six months before the end of another war, the Second World War, contains further stanzas.

What, then, is the view of a man living in California? In the booklet mentioned above, the reason for the First World War is given as “Germany’s ambition for power and expansion of

territory". The results of the War are listed as "[t]he curbing of Germany's ambition. The overthrow of the German government. The liberation of several small nations". I was somewhat irritated by the use of the verb "to curb" in this context. Horses can be "curbed" or kept in check; and in a pamphlet issued by the Department of Motor Vehicles "to curb" is used when instructing a driver to turn the front wheels of a parked vehicle in such a way that on a very steep street the curb prevents a "run away vehicle". The image has the same effect on me as a surreal painting, because where else is it possible to block the pursuit of power by means of a curb stone? The booklet does not mention that one result of the War was that other European countries, such as Italy, were successful in realizing their ambition to expand their territory; that the German Empire's colonies in the Pacific were delivered into America's "trustworthy hands"; and that one long-term consequence of the War was the disintegration of the European nations' colonial empires, something which allowed the United States to rise to the "number one" spot amongst the leading powers.

The American nation grew with every war on the above list. For example, one result of the war against Mexico was the "[a]ddition of New Mexico and California to United States territory". According to the booklet, the reason for this war was the "[d]ispute over the boundary line between two countries". However, if we consult the *Brockhaus-Lexikon* we can read about a "military conflict between the USA and Mexico which was provoked by the American annexation of Texas (29. 12. 1845) and the USA's interests in California and New Mexico".⁵⁷ In a different entry in the *Brockhaus-Lexikon* we can also read that sections of today's US state of Arizona were also incorporated on this occasion. The union of the New England states, initially quite small, expanded to its greatness in the same belligerent manner as once the Roman Empire — but with the one small exception to the historical process: that it was not always wars which contributed to the expansion of the nation but sometimes money as well.

California and most of the other states were spared a war on their territory. That had consequences. The population of the USA cannot imagine precisely what damage a war in one's own country can cause. As the physicist Freeman Dyson, who experienced the Second World War as an airman in the British Air Force, writes in his book *Disturbing the Universe*, the young Americans he met lacked any sense of the "tragic".⁵⁸ He contends that it was only after the war in Vietnam that something changed in the United States. I hope the "something" he refers to is sufficiently "great"! I am plagued by doubts on this score when I read

⁵⁷ *Brockhaus-Lexikon* (Leipzig: Brockhaus, 1996), vol. 14, p. 578.

⁵⁸ New York: Basic Books, 1979.

conversations between Donald Trump's schoolmates at high school, who — allegedly — regretted that since its victory in the Second World War America had triumphed only in small conflicts but not in an actual war. Young people in Europe possess a highly developed sense of the tragic. It is due to the different attitudes to war, and probably also to the different experiences of war suffered by several generations, that most Americans fail to understand why war is hated so much in many parts of Europe.

What do school textbooks in America have to say about the war between America and Mexico? Are events read through the same rose-tinted glasses? Do we find a text similar to the eulogy in Hennessey's booklet?:

Americans are justly proud of the fact that the declared wars in which our country has been engaged have been wars waged in behalf of freedom and right. The thousands of American soldiers who have given their lives in these battles have not died in vain. Every declared conflict has resulted in a victory for the cause which our country championed. Not only have our own people secured and maintained their independence, but the people of many other countries have gained freedom through the help that the United States has given.⁵⁹

Viewed from the perspective of post-war Germany, in the Mexican War the United States cherished the same “ambition for power and expansion of territory” as Hennessey attributed to the German Empire.

If I apply this template to the years between 1960 and 2017 I discover that America has remained “great” throughout this entire period. The Soviet Union has broken up, but the United States of America remain. The disintegration of the Soviet Union took place sometime after 1989, when Boris Yeltsin, together with a couple of presidents of the constituent republics, dissolved the Union of Socialist Soviet Republics. Thus the Soviet Union vanished from history and a few nation-states came into existence, such as Russia, Estonia, the Ukraine and Kazakhstan. The break-up of the Soviet Union had been predicted by the German physicist and philosopher Carl Friedrich von Weizsäcker, who in the 1980s was Director of the Max-Planck-Institut zur Erforschung der Lebensbedingungen der wissenschaftlich-technischen Welt [Max Planck Institute for the Study of the Living Conditions of the World of Science and Technology] on Lake Starnberg. I can still vaguely remember reading in a book published by this Institute that at some predictable point in the future the Russians would not be “masters in their own home” because the birth rate of the southern Soviet republics, shaped as they were by Islam, would outstrip the birth rate of the

⁵⁹ Hennessey, *Twenty-Five Lessons in Citizenship*, p. 70.

Russian heartland. The USSR-dominated military alliance, the Warsaw Pact, also disintegrated; NATO, the military alliance founded on the initiative of the USA, remains in existence. Hence the American people were spared the humiliation of being called a superpower that had sunk to the second rank. Svetlana Alexievich's book *Secondhand Time: The Last of the Soviets* tells us about the effect of this decline on the consciousness of the Russian people and how they yearned for the rise of a strong man who would make Russia great again.⁶⁰ The strong man came and he restored Russia's pride and a half-way stable economy.

Of course, I also remember von Weizacker's warning that the disintegration of the Soviet Union would result in a longer list of countries in the world which would have to be counted amongst the nuclear powers. This would happen very simply: the Soviet Union's nuclear weapons were located in several republics of the USSR; and after these went their separate ways Russia, Kazakhstan, the Ukraine and probably one or other of the former Soviet republics, too, would become nuclear powers. I attribute considerable presence of mind to the then-Russian government when it declared all nuclear weapons to be Russian property and insisted on bringing these weapons back to Russian territory. In this way only Russia remained a nuclear power. By contrast, they could not take with them the technical colleges and offices in Kharkiv where the Soviet Union's missiles were built. On 16th March 2017 the *Frankfurter Rundschau* carried, on page 20, the third instalment of a report on the journey through the USA undertaken as a farewell tour by the journalist Damir Fras. He relates that the fifty-four-year-old journalist Steve Kettmann, who lives in Soquel, California, wanted to write a novel, compelled by pure frustration over Donald Trump. Kettmann:

says he wishes to write a novel about an alternative future, by analogy to the alternative facts invented by Trump's troops. California, Oregon and Washington, the states on America's west coast, split off from the rest of the country, take Hawaii with them and form their own state, one in which Trump has nothing to say.

I think this state would be a nuclear power because the atomic bomb was a product of the University of California; and on the San Francisco Bay in Alameda, Oakland, is located the harbour from which the battleships of the country of "Pacifica" would put out to sea, their atomic bombs on board.

Two further dangers which seemed to threaten when the Soviet Union collapsed were fortunately averted with the help of the United States. Plutonium, the material used in making

⁶⁰ London / New York: Random House, 2016; German: *Secondhand-Zeit. Leben auf den Trümmern des Sozialismus* (Berlin / Munich: Hanser, 2013).

bombs, did not fall into the “wrong hands”; and the scientists and engineers of the former Soviet Union who were experts in bomb technology did not emigrate to the “wrong countries”. The collaboration between the USA and Russia gave cause for hope: namely, that it would be possible to eliminate all nuclear weapons from the world. However, things turned out differently. They were still around in 2017, those nuclear weapons, but the number of operational warheads possessed by the great nuclear powers had been reduced to seven thousand (USA) and 7,290 (Russia).⁶¹ There were good, rational reasons for the reduction in the number of atomic bombs. Recently Donald Trump announced that he wished to increase the number of the USA’s nuclear warheads and to modernize the bombs already in existence. With this declaration he made himself into the mouthpiece for all those people in the USA who had been out of tune with the whole direction of previous American policy. In the 1980s those people, who always found their home in the Republican Party, had experienced mincemeat being made of their arguments against nuclear disarmament. In 2017, after over thirty years of whispering quietly, they were back, shouting loudly and putting forward the old arguments. I still remember the words of a group captain in the United States Air Force who, at that time, opined that “in the late 1940s we [the United States Air Force] should have fired an atomic bomb at the Soviets before they had one of their own”. The group captain waited for a second opportunity, which he assumed would follow the break-down of negotiations on disarmament. My information comes from an article by Roger Molander.⁶² I wrote about this article in Chapter 2 and in 2017 thought we were long since through all that. In the same chapter I made the following comment: “When, today, I read those words written thirty years ago I feel rising in me the fear that some like-minded naval captain could trigger a nuclear war” (p. 31). Some captain in the Navy? There could be worse yet to come!

Roger Molander names no names but I discovered a name, address and face on a circular letter from the time. The letter was filed amongst my personal documents and would have stayed there unnoticed had Donald Trump not scared me. Hence I cite here a text that Major General George J. Keegan, Jr., Director U.S. Air Force Intelligence (Retired), sent to his “Dear Fellow American” in 1982:

Dear Fellow American,

Will you help my friend, Martha Rountree, fight to stop attempts to freeze America’s nuclear defenses?

⁶¹ ZEIT-GRAFIK/Quelle SIPRI, status January 2016 (*Die Zeit*, 16th February 2017, p. 3).

⁶² *Tribune/TODAY*, 28th March 1982.

Right now, left-wing activists are mobilizing all over America to force a total freeze on nuclear weapons which we need to counter a massive Soviet arms build up.

Many of these nuclear freeze activists want to see a one-sided disarmament by America alone.

Worse, some of them are linked to pro-Communist groups that work for world-wide Soviet domination.

And I fear they will succeed in fooling many Americans.

A one-sided nuclear freeze will not help world peace.

As former head of Air Force intelligence, I was aware of top secret information on the Soviet nuclear build-up.

I am well aware that we have allowed our defense capability to fall well behind that of the Soviets.

Right now, our defenses may not be enough to stop our Communist enemies from launching an overwhelming nuclear attack on us ...

... or more likely, to intimidate and blackmail us with their vastly superior nuclear arsenal.

We must negotiate with the Soviets from a position at least equal to theirs, and not from a position of weakness.

Call for an immediate Congressional investigation into the nuclear freeze movement.

We need to expose the faulty and blind assumptions which underly much of the current nuclear freeze rhetoric.

For American Security
(Signature of George J. Keegan. Jr.)
Major General George J. Keegan. Jr.
Director, U.S. Air Force Intelligence
(retired)

The letter is only a single typed page long and shows a passport photo of the General looking earnestly into the camera, in full uniform with the bar of his medals visible to the viewer. In

the appendix to the letter is a slip of paper with the request to send a cheque for \$16, \$32, \$48 or \$96 to Martha Rountree, President of the Leadership Foundation. I have singled out merely a few of the Leadership Foundation's arguments, which are all laid out at length over the four pages of the postal item:

The bottom line is what Dr. Edward Teller, "father" of the hydrogen bomb, said recently:

"If the nuclear freeze goes through, this country won't exist in 1990."

And yet the U. S. House of Representatives in May passed, by a 278-to-149 vote, a resolution calling for a NUCLEAR FREEZE.

The thing with Edward Teller is a chapter in its own right, one I have already written and shall include in the third book in the trilogy. Edward Teller was known for liking to terrify people with his apocalyptic visions. We no longer need to be terrified as we have reached the year 2017 and are still alive! However, the fear that something dreadful might happen before 1990 was a very real one, most specifically amongst the proponents of disarmament. They feared that time might slip between our fingers; and therefore feverish efforts were undertaken to canvas for the signing of a substantial treaty on the reduction of nuclear weapons before 1990. The aspired-to treaty was, indeed, signed before that year. With it more was achieved than the Nuclear Freeze Movement had ever considered possible. This movement had aimed at a freeze on nuclear weapons stored on both sides of the Iron Curtain.

The Freeze initiative of 1983 had been launched by members of both large American political parties. In 2017 the situation is different. The Republican Party seems to me to have left the coalition against nuclear weapons and have been taken captive by politicians on the extreme right of the party. I deduce this from the statements issued by this party during recent years. To crown it all, there are now politicians who are resistant not just to the facts but also to well-qualified advice — and proud to parade this characteristic in public. Nevertheless, the way many politicians argue in 2017 is defter than George J. Keegan, Jr. in 1982. Despite this, one of my English friends still says "Bla, Bla Bla!" whenever he hears politicians making promises. When I look at him questioningly he explains that the English queen Elizabeth I had called out, "This is all Blarney; he never means to do what he says", when her vassal from Blarney, a castle near Cork, wriggled out of his oral promises for the umpteenth time. This gave rise to the legend that anyone who kisses the Blarney Stone, now kept in the battlements of the tower, acquires the gift of baffling eloquence.

“Does the Federal Government share the concern of US Secretary of Defense Weinberger, who observed with regard to nuclear weapons: ‘In particular, we need always to be mindful of the danger of accidents and unanticipated failures, both human and technical’ (DOD, Annual Report to the Congress, Fiscal Year 1983, p. I – 19)?”⁶³ This question was submitted to the government of the Federal Republic of Germany by the Member of Parliament Petra Kelly (Green Party) in a “Small Enquiry” in 1985. Chapter 5 contains a comprehensive report on the Federal Government’s reply and, indeed, on the whole matter. Basically, the discussion of the technical safety of atomic bombs focussed on one main aspect: that a country’s “own” atomic bomb, kept, for example, in a storage facility for nuclear weapons, might explode due to a technical failure. In 1982 the argument that merely the possession of atomic bombs already posed a threat to the lives of a country’s population was important in America and in large part contributed to the American government’s readiness to engage in negotiations on disarmament. The number of warheads in the USA and Russia has been reduced to roughly seven thousand for each country, yet even today the danger that one of a nation’s “own” bombs could unleash a nuclear inferno has still not been averted. Every additional bomb in the United States brings with it the increased risk of an accident involving an atomic bomb in the very country where this bomb is stored. Up to now Donald Trump has demonstrated considerable reluctance even to acknowledge this correlation. When Donald Trump talks about scientific matters he frequently appears to me to be inadequately equipped for the undertaking. “Fat people shouldn’t wear shorts”, the gentlemen sitting two tables down from us drinking his afternoon tea muttered quietly to himself when he saw sloppily dressed people wandering through the sacred precincts of the temple. I heard the muttered words and thought: “You are absolutely right, Sir!”.

In many circles in America the disintegration of the Soviet Union was registered with satisfaction. Those were the circles which liked to see themselves as victors in the Cold War. The “democratic system” had triumphed over the “Communist system”! I would be stabbing myself in the back if, at this juncture, I pointed to the Conservatives, the Republicans and the Nationalists. In many places in my five letters I have highlighted how the cliché of the Lone Ranger is used to impress upon the whole of American society the model of a victorious hero. In Chapter 2, “The Danger of War with Nuclear Weapons”, I have also let Rear Admiral A. D. of the American Navy Gene LaRocque have his say (p. 33; extracts):

⁶³ Available at: http://history.defense.gov/Portals/70/Documents/annual_reports/1983_DoD_AR.pdf?ver=2014-06-24-150929-423.

One of the reasons this arms race keeps going is that military men honestly think they could win a war [...]. We don't go into this business thinking that we are going to [...] use our energies to have some kind of a draw [...]. [...] so we are constantly asking for more [...] more destructive weapons [...] so that we can get the jump on the other fella and win the war.

I remind you that Rear Admiral LaRocque was not one of the hawks but on the side of people who campaigned for the disarmament of nuclear weapons. The people I talked to in the Hill Employees for the Nuclear Weapons Freeze saw the situation as follows (described on p. 56): “History has presented enough examples of the build-up of arms between two nations leading to war, but [...] the arms race has, on the other hand, only rarely been abandoned because one of the adversaries went bankrupt”. We all preferred the third possibility, namely that the arms race be ended through negotiation. Should we, however, now spend time arguing whether we are still alive because the USSR was driven to bankruptcy by its expenditure on armaments, or because both superpowers recognized in time the danger to both sides represented by a build-up of nuclear armaments?

There are people and politicians who sail the same seas as Donald Trump. This became clear to me when several articles appeared in the weekly paper *Die Zeit* on 16th February 2017, shortly before the NATO Security Conference in Munich. The article (on pages 2 and 3) which particularly upset me was written by the editors Peter Dausend and Michael Thumann. Under the headline “NATO’s Nuclear Deterrent Is No Longer Credible. Does the EU Need The Bomb?”, the two journalists discussed the consequences for the security of Germany and the countries in the European Union arising from the following utterances by Donald Trump: “The countries we defend have to pay for it. If they do not, the USA must be ready to let these countries defend themselves”; and “NATO is obsolete”. “The wolf is at our door!”: once again this cry rang out, one I had already heard in 1982; and this time it was the Poles who were afraid of Russian armed forces, which had allegedly installed in Kaliningrad (formerly Königsberg in East Prussia) missiles which could be equipped with atomic bombs. The saying “Do not cry wolf!” is used in English to warn against deliberately raising a false alarm. In the story from which it derives, a little girl twice cries “wolf”; and the adults who rush to her aid discover that the girl only did so as a joke. The third time, however, when the wolf really does appear, the adults stay away. I have already heard the warning cry “wolf” so often and so often the wolf has never actually appeared, so that once again I ask myself whether the warnings from a “nuclear specialist”, this time from the Polish Institute of International Affairs, can be taken seriously. The two journalists from Hamburg obviously

took the warning cries seriously and assumed that the “trans-Atlantic” bunch wanting to come to Munich would do the same. They asked themselves: “How would Europe acquire a nuclear umbrella for itself if the Americans clapped their umbrella over Europe shut?”. The journalists took as the basis for their deliberations the notion that politicians in Europe would think along the same lines as they did; and that if the bombs of the French (three hundred) and the British (215) could not replace the huge nuclear deterrent of the Americans (seven thousand bombs), then governments would have to find out whether any other bombs were either available or purchasable. If it was borne in mind that both “politicians” and the “public suppressed the fact that Germany has long been somewhat involved in nuclear deterrence”, it would always be possible to have a look at what the Bundeswehr was doing. The German army had:

Tornado jets equipped with B-61 bombs, nuclear bunker-bashers from the US arsenal. However, Germany does not have these bombs freely at its disposal. It is only permitted to deploy them if Washington gives the green light. Italy, Belgium, the Low Countries and Turkey also possess such American weapons.

Germany an atomic power? “Jaroslaw Kaczynski, leader of the ruling Polish Law and Justice Party and Poland’s strong man, demands” no less from Europe than that “its own nuclear power must be able to keep pace with Russia’s”.⁶⁴

For me, the whole article looked as if it had been commissioned by the relevant circles, those who wished to ignore the unmasking of a myth: namely, the view that security can be achieved by means of deterrence through nuclear weapons. The strong man in Poland may not have followed the discussions which went on in the West in the 1980s, but when “experts” from the West once again claimed to believe so firmly in the nuclear umbrella, or said that deterrence had functioned and then went one better by asserting that victory in the Cold War had been won on the basis of the Americans’ nuclear weapons — this really shook me. My shock soon turned into fury. I had spent almost all of Chapter 4 of my book documenting how these notions had been exposed as absurd. Now they were back, almost unaltered! It seemed to me as if the success achieved by the worldwide movement against the arming of military forces with nuclear weapons was about to be steamrollered into the ground.

In my agitation I overlooked the fact that the word “security” had slipped into a chameleon skin. Its colours change with its environment. The closing salutation, “For American Security”, which Major General George J. Keegan, Jr. had included at the end of his letter,

⁶⁴ The quotations are taken from the article from *Die Zeit* cited above.

could also be interpreted as, “For more atomic bombs in America’s arsenal”. I suspect that in many military circles security is synonymous with atomic bombs. I wonder whether the whole newspaper article was intended to accustom us normal newspaper-readers to the idea that security and atomic bombs go together. Was the Munich Security Conference basically a conference about nuclear armament? It came to my ears that someone had said: “Sometimes you take an innocent word and change its meaning”. I decided to search for other chameleonesque words.

When, on 11th September 2001, two aeroplanes smashed into the Twin Towers of the World Trade Center in New York it was initially not obvious how that could have happened. When the first plane crashed into one Tower of the World Trade Center and started a fire in some of its upper stories, most of the eyewitnesses thought it had been an accident. This Tower, from which clouds of smoke were billowing forth, was shown on television broadcasts all over the world; and so I was also able to see how a second aeroplane was steered into the second, as yet undamaged Tower. From this moment on it was clear to many observers that an attack had been carried out. As emerged in the course of the investigations, a small group of terrorists had, in a coordinated action, taken control of four planes in all and navigated two of them into the Towers of the World Trade Center in New York. A third plane damaged the Pentagon, the American Department of Defense. The fourth plane crashed into a field and was smashed to smithereens after its occupants had staged a desperate attempt to overwhelm their kidnappers. The people who had carried out the attack came from countries with an Islamic culture, most of them from Saudi Arabia. The organizer of the attack was a certain Osama bin Laden, who had attacked the Trade Center once before. This is the information which the investigating authorities gathered over the course of time.

At the time of the attack the President of the United States, George W. Bush, was sitting in a classroom in a school in a small American town, reading to the schoolchildren from a book. He had not seen the pictures on television which had been broadcast to the entire world, but was informed by members of his staff about the incidents in New York and at the Pentagon. Since the President’s school visit was being filmed, the scene in which the member of staff approaches the President and whispers something in his ear is captured on film. The words of the news whispered to the President have not been captured.

The film maker Michael Moore integrated the recording of the moment when the President was informed into his film *Fahrenheit 9/11*. You can see how George W. Bush, for several minutes after being told the news, remains seated on his chair, as if turned to stone. His face,

too, is completely immobile and gives no hint of how the news had affected him. Here we should note that in all his public appearances George W. Bush's facial expression was always remarkably "empty". It was, therefore, impossible for a normal observer to read his impulses and emotions from his face. Michael Moore gives a disrespectful commentary on the scene. In my opinion, he wronged George W. Bush by doing this. Michael Moore should previously have done some research into what the member of staff had actually whispered into the President's ear. Moore may have done that, but received no answer from government circles to the question about the whispered words. According to an unofficial source it was just a single sentence: "The United States have been attacked!". I think this sentence was incendiary and might — potentially — have been the spark needed to ignite a nuclear inferno. I want to explain this thought in greater detail straightaway. These days the incumbent President of the United States frequently talks about "fake news"; and with these words Donald Trump accuses journalists of inventing news with the intention to deceive. In order to avoid a similar approach, I must honestly admit my inability to provide robust, credible proof that precisely this sentence was whispered into George W. Bush's ear. If I were writing a novel I would be off the hook, since I would use my imagination to fill the gaps in my knowledge and at the end of the book add the disclaimer that any resemblance to actual events was purely coincidental. Like many of my contemporaries I know to this day where I was on that 11th September when the news of the attack in New York was spread. I was in the control room of the particle accelerator at the Hahn-Meitner Institute in Berlin; and I remember the queasy feeling that came over me when I saw the burning Towers. What could, what would come from all this?

For decades the people on this earth, including me, had lived with a "balance of terror". We clung to the belief that the "enemy" would not launch a surprise attack with nuclear weapons because our governments had warned that any nuclear attack would be answered by reprisal with "our" nuclear weapons. However, we were always in a state of tension, fearing that an attack with nuclear weapons really could come at any time. Thus the word "attack", which initially revealed nothing whatsoever about the offensive weapons deployed, gradually came to be associated in many people's minds with an attack using nuclear weapons. That may also have been the case with George W. Bush; and he will have remained seated on his chair, frozen in horror, because he believed that the event America had feared had actually come about. Subsequently I found George W. Bush's reaction to be very human. We observers, who were, thanks to television, better informed about events in New York than the President of the United States, would have understood the whispered words differently.

It is not clear to me whether the members of President George W. Bush's staff were not better informed at the time or whether they delivered deliberately skewed news. The entire programme to "save the President" which was played through after the school lesson could only confirm George W. Bush in the assumption that a nuclear attack had taken place. I had then, and have today, no inkling of how close we came to the brink of catastrophe, but this episode taught me that — whether accidentally or intentionally — imprecise, incomplete or manipulated information could very easily ignite a nuclear conflict. During George W. Bush's term in office things once again turned out alright! However, will that always be the case if the President and his staff are repeatedly prone to misjudgement or continually talk vague drivel? You cannot negotiate with chance; it strikes at its own convenience. Scientists attempt to pin it down with the aid of mathematics. They say that the probability of an explosion of an atomic bomb can only be reduced; and reduced to zero only when there is not a single atomic bomb left on this earth. That would be the return to Paradise, where no one need fear the bomb. In this Christian image the invention of the bomb represents the Fall of Man; and it is highly likely that his Fall can no longer be undone. Let us at least strive to use language precisely so that the probability is lessened.

After the destruction of the World Trade Center it became the custom to call the place where the Towers had once stood "Ground Zero". This usage was adopted the world over. When I was asked exactly what "Ground Zero" was and was in the process of embarking on a lengthy explanation, I realized that I ought to forbid the residents of New York to talk about "Ground Zero" when they spoke about the attack on the World Trade Center. "Ground Zero" used to be a term conceived specifically for the deployment of atomic bombs and precisely that is what it should become once more. In order to increase the impact of an atomic explosion, the bombs are usually ignited several hundred metres above the earth's surface and "Ground Zero" marks the spot on the surface above which the atomic bomb is ignited. "Ground Zero" was a new linguistic coinage and firmly correlated with the damage done by dropping an atomic bomb. That remained the case until the residents of New York took pleasure in using the term "Ground Zero" to characterize a catastrophic event, the damage caused by which comes nowhere near the catastrophe caused by the explosion of an atomic bomb. It seems to me as if someone were twittering: "Look, the catastrophe was dreadful, but we New Yorkers are tough, we have survived it! The dropping of atomic bombs is also dreadful but it is possible to survive them!". We can also listen to the New York doctor Jack Geiger, who, in the film *The Last Epidemic*, describes the catastrophe triggered by an atomic bomb (see Chapter 3). Peter Joseph, President of the San Francisco Chapter of Physicians for Social

Responsibility, hopes that “an accurately informed public, sensing this threat to its survival, will act on its instinctive aversion to communal suicide”.⁶⁵ I have severe doubts whether the hope expressed by Peter Joseph can survive when sharply cutting terms intended to have an impact in the campaign against nuclear weapons are blunted by their use in other contexts.

In March 2017, when it was enough of a challenge not to be upset by Donald Trump the whole time, the Turkish President Tayyip Erdoğan started behaving offensively. He called Germany a nation of Nazis. I read about this in the newspaper, felt attacked and was angry. Our Turkish friend Nami succeeded in calming me down. However, I was still feeling slightly upset when Noyan, Nami’s ten-year-old son, joined us and asked me how to recognize Nazis. I quoted the line, “We shall march on when all around us is smashed to smithereens”, taken from a Nazi marching song. I added that as a child I had witnessed the ruins of German cities, their smithereens, when the Nazi era had already passed. “But you can get smithereens and ruins any time an atomic bomb is dropped!”, Noyan objected. Where did he get that from? Did ten-year-olds talk about things like that in school? “That won’t happen”, I said, because it was not alright by me that children should grow up in fear of atomic bombs. I said that Abraham had haggled with God and had wrung the promise from God that Sodom and Gomorrah would not be destroyed as long as ten righteous men could be found in those cities. “I think that applies to us, too”, I said. Nami looked at Noyan, who looked at me with his big, dark eyes, and asked him, “Noyan, do you know ten righteous men?”. Noyan’s response was: “You, Mummy, Daddy and me, Fynn, Sandra, Dennis, Lia and Liv, Wolf and Eva”.

⁶⁵ See Chapter 3, p. 43.