

THE HERASAGA

BOOK ONE: HERA, OR EMPATHY

BOOK TWO: THE PRIESTHOOD OF SCIENCE

BOOK THREE: HERA THE BUDDHA

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Figure 1 Yucca brevifolia in bloom, Joshua Tree National Park, California (Photo: W. Leiss)

HERA THE BUDDHA

A WORK OF UTOPIAN FICTION

WILLIAM LEISS

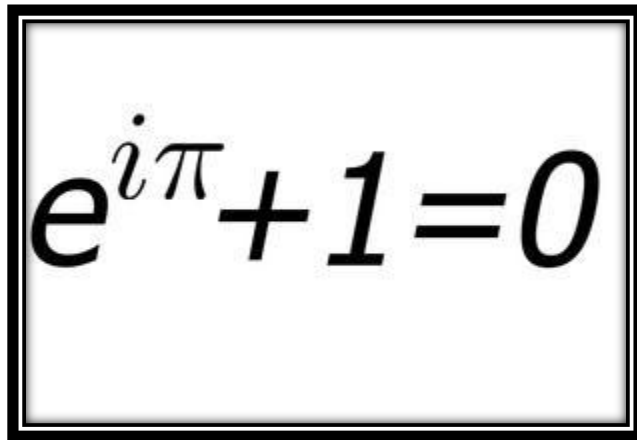

$$e^{i\pi} + 1 = 0$$

Figure 2 Euler's Identity

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COVER ARTWORK: ALEX COLVILLE (CANADIAN 1920-2013),
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for HEIDEMARIE and THE DAUGHTER

EPIGRAPHS

What happens when machines become more intelligent than humans? One view is that this event will be followed by an explosion to ever-greater levels of intelligence, as each generation of machines creates more intelligent machines in turn. This intelligence explosion is now often known as the “singularity.” If there is a singularity, it will be one of the most important events in the history of the planet. An intelligence explosion has enormous potential benefits: a cure for all known diseases, an end to poverty, extraordinary scientific advances, and much more. It also has enormous potential dangers: an end to the human race, an arms race of warring machines, the power to destroy the planet.

David Chalmers (2010)

As if somehow intelligence was the thing that mattered and not the quality of human experience. I think if we replaced ourselves with machines that as far as we know would have no conscious existence, no matter how many amazing things they invented, I think that would be the biggest possible tragedy. There are people who believe that if the machines are more intelligent than we are, then they should just have the planet and we should go away. Then there are people who say, ‘Well, we’ll upload ourselves into the machines, so we’ll still have consciousness but we’ll be machines.’ Which I would find, well, completely implausible.

Stuart Russell (2017)

We are the first species capable of self-annihilation.

Elon Musk (2017)

If you want a picture of A.I. gone wrong, don’t imagine marching humanoid robots with glowing red eyes. Imagine tiny invisible synthetic bacteria made of diamond, with tiny onboard computers, hiding inside your bloodstream and everyone else’s. And then, simultaneously, they release one microgram of botulinum toxin. Everyone just falls over dead. Only it won’t actually happen like that. It’s impossible for me to predict exactly how we’d lose, because the A.I. will be smarter than I am. When you’re building something smarter than you, you have to get it right on the first try.

Eliezer Yudkowsky (2017)

[W]e need not worry about the forecast that, in the near future, a “really smart” digital computer/machine will supplant human nature or intelligence. In all

likelihood, this day will never come because, in a more-than-convenient arrangement, our most intimate neural riddles seem to have been properly copyright-protected by the very evolutionary history that generated our brains, as well as the very complex emergent properties that make it tick. As such, neither evolution nor neurobiological complexity can be effectively simulated by digital computers and their limited logic.

Miguel Nicolelis (2014)

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Chapter 4: Seven Figures and the Agony of Modernity

IMAGINE A HORIZONTAL LINE drawn along the 50° N latitude across Europe, extending from the westernmost part of Germany – where Germany, France, and Belgium meet – to the easternmost part of the Czech Republic. This line, which passes through the cities of Frankfurt/Main and Prague, should extend more precisely in terms of longitude from about 7° E to 18° E. Now place a vertical line extending south at the western end of the first line, to 48° N (where Munich and Vienna are found), thus encompassing two degrees of latitude, and complete the elongated rectangle, which in linear distance will run about 900km from West to East and about 300km from North to South. Highlighted on a map of Europe, this would appear on the vertical axis as a narrow band of territory

stretching horizontally from the western border of present-day Germany to the eastern border of what is now Czechia (Czech Republic).

In the earlier part of the nineteenth century, when the story related here begins, the modern nations of Germany and the Czech Republic did not yet exist: What later became Germany was forged by Bismarck in 1871 out of some dozens of principalities and states in the German Confederation, and the lands now known as the Czech and Slovak Republics were a part of the Austro–Hungarian empire. Our rectangle encompasses some famous old cities, of course, but at that time it was largely composed of smaller towns and villages, populated by merchants and artisans and surrounded by small farms and larger landed estates. Within these little towns lived a cowed and oppressed people, of ancient lineage, which was deprived of full membership in civil society and whose children traditionally had been denied access to higher education and many of the ordinary occupations, especially professions such as medicine and law, but even farming – although these deprivations were beginning to change throughout the nineteenth century and would be substantially cancelled by the end of that century.



Figure 6 Map of Europe in 1848

These people were of course the Jews. They sought to live unobtrusively amongst their compatriots who professed various forms of Christian faith, while holding ancient memories of slaughters and torture during the Crusades and the Inquisition, and more recent acquaintance, further East in Poland and Russia, where their own populations were substantially larger than they were in the West, of periodic violent pogroms and confinement to the *shtetl*. Embedded deeply in both of the competing Abrahamic

religion, Islam and Christianity, antisemitism had become a persistent, pervasive, poisonous vapor, hugging the ground like a heavier-than-air gas, until it seemed as if it has saturated nature itself so thoroughly that even the horror of the Holocaust has been unable to wash it away.

In Western and much of Central Europe the Jews were but a tiny minority of the whole population, and yet, out of this little cadre scattered throughout a relatively small geographical area (our irregular rectangle), there emerged in the nineteenth century a set of seven individuals, drawn from the Jewish communities therein, all of whom would make ground-breaking intellectual innovations, revolutionizing art and thought and helping to inspire the creation of what we now know as modernity. These seven, in order of birth, were Karl Marx, Sigmund Freud, Edmund Husserl, Gustav Mahler, Albert Einstein, Emmy Noether, and Franz Kafka.

For my purposes, it is unnecessary to speculate overmuch on how or why such a flowering of individual genius could emerge from these small communities which were still living in the shadows of the larger society. One important factor, to be sure, was that during the nineteenth century in Europe those communities were being freed from centuries of civil restrictions on their activities and educational opportunities, leading them to full civic participation while by no means relieving them from the persistent and pervasive anti-Semitism among their countrymen. Another factor is the long tradition of love and respect for learning among them, embodied in their rabbis. There are surely other factors as well. What, in brief summary, was their life, work, and fate?

Karl Marx (1818–1883) was born in Trier (lat. 49° N, long. 6.6° E), at the westernmost edge of our rectangle, in what is now the southwestern German state of Rhineland–Palatinate. Marx's maternal grandfather was a Dutch rabbi, while on the paternal side his forefathers, down to his grandfather, had been the rabbis in Trier since the early eighteenth century. His upwardly-mobile father, however, who became a lawyer and owned some Moselle vineyards, converted from Judaism to Lutheranism before his son's birth in order to be freed from the many civil restrictions still imposed on Jews. Marx, who is, I believe, without peer in the field of modern social thought, cannot carry any personal blame for the misuses of his theories in the service of

oppression in the Soviet Union, China and elsewhere. Among other things he had a great impact on progressive social democracy, especially in Germany, and early twentieth century European history might have taken a better course had his followers been able to resist the destructive nationalism that led to World Wars I and II.

Sigmund Freud (1856–1939) was born in what was then the small village of Freiberg – now called Příbor – which lies in northeastern Moravia, and is at the easternmost edge of our rectangle at lat. 49° N, long. 18° E. His ancestors were Hasidic Jews from Galicia (Ukraine) and his father, a wool merchant, was known as a scholar of the Torah. Sigmund, who was born in a rented room in a locksmith's house, was three years old when his family moved to Vienna. Although he is best known for psychoanalysis and the theory of the unconscious, in my view the great depth of his thought is best found in the area of socio-cultural theory, especially in the short work, *Civilization and its Discontents* (1930). By 1938 he had a worldwide reputation and was celebrated by many notable intellectual figures, which failed to impress the Nazi authorities, who held him for ransom in Vienna, where he was already suffering from the buccal carcinoma – the result of his lifelong cigar smoking – that would kill him little more than a year after his settling in exile in London. His four elderly sisters, who had been left behind in Vienna, were murdered in the Nazi camps.

Edmund Husserl (1859–1938) was born in the small village of Prostějov (Prossnitz in German) in eastern Moravia (lat. 49° N, long. 17° E), a short distance from Freud's birthplace. His father was a textile merchant. After early study in mathematics, he switched to philosophy and became known for founding the school of thought known as phenomenology, and his later illustrious academic career took place entirely in Germany. His work remains very influential down to the present day, with many later

thinkers paying tribute to his insights, and it is fair to say that he was the most important philosopher of the twentieth century. His last and perhaps most important work is *The Crisis of the European Sciences* (1936); the original German text of this book had to be published in Belgrade, since by that time Hitler's regime had proscribed all publications by Jews (his earlier conversion to Protestantism made no difference, of course).

Gustav Mahler (1860–1911) was born in the village of Kaliště or Kalischt (lat. 49° N, long. 15° E), in eastern Bohemia, now in the western half of the Czech Republic. His grandmother had been a street peddler, and his father became a coachman and later an innkeeper. When he was four years old his family moved to Iglau, a short distance south, where his father operated a tavern and distillery. At age 15, following a short and unhappy try at schooling in Prague, Gustav was accepted at the Vienna Conservatory of Music after auditioning before the famous pianist Julius Epstein. Mahler had converted to Roman Catholicism (the state religion of the Austro–Hungarian Empire) in 1897 in view of the prohibition against appointing a Jew as director of the Vienna Court Opera; shortly thereafter he was also appointed as the conductor of the Vienna Philharmonic Orchestra. As a composer, he was undoubtedly the greatest figure in the Western tradition of symphonic and vocal music in the twentieth century.

Albert Einstein (1879–1955) was born in Ulm (lat. 48° N, long. 10° E), in what is now the southern German state of Baden–Württemberg, at the southern edge of our rectangle. At the age of one year his family moved to Munich, where his father and uncle were industrialists who manufactured electrical equipment. There is a telling incident from his childhood in Munich: One of his teachers brought a long nail into the classroom, telling the students that with such a nail Christ was affixed to the cross, after having been betrayed by the Jews, whereupon all the other students instantly turned in their seats to stare at the young Albert. The five path-breaking papers he published in his *annus mirabilis* of 1905 – the result of working entirely alone as a clerk in the Swiss patent office – are a landmark in the history of physics. His special theory of relativity from that year was so revolutionary that the Nobel Prize committee, belatedly awarding him the physics prize in 1921 (but not for this theory), forbade him to mention relativity

in his public speech at the awards ceremony – a prohibition which Einstein mischievously ignored. His general theory of relativity from 1916 remains today the unsurpassed account of the workings of the universe on a large scale.

Amelia Emmy Noether (1882–1935) was born in Erlangen (lat. 49° N, long. 11° E), a small city situated northwest of Nuremberg in Bavaria. Earlier generations of her family on both sides were merchants, but her father, who was largely self-taught, made a reputation in mathematics. She was called by Einstein and others the most important woman in the entire history of mathematics, and “Noether’s theorem” has been described as the single most important mathematical contribution to modern physics. Despite her acknowledged brilliance, as well as the support of influential professors such as Hermann Weyl and David Hilbert, no university in Germany would award her a professorship on account of her gender.

Noether can appropriately stand as the representative for an entire generation of Jewish women who broke down the barriers to higher education in the sciences in those years, such as Lise Meitner (1878–1968), the first woman to become a full professor of physics in Germany, who discovered atomic fission and who was forced into exile in Sweden after 1938 and was unjustly deprived of a share in the Nobel Prize won by her long-term collaborator Otto Hahn in 1944. And Clara Immerwahr (1870–1915), born on a farm near Breslau in what was then eastern Prussia (now Wrocław in Poland), who was the first woman to be awarded a doctorate in chemistry in Germany, and who, having

married Fritz Haber, killed herself with his service revolver after failing to persuade him to stop his work on weaponizing chlorine gas during World War I.¹

Franz Kafka (1883–1924) was born and lived his whole life in Prague (lat. 50° N, long. 15° E), in the state of Bohemia, Czech Republic. His family was Ashkenazi Jews, and his father was a successful salesman and retailer. Franz was diagnosed with tuberculosis in 1917, at the age of thirty-four, and spent most of the rest of his life in sanatoria, dying in Austria where he had gone for treatment. None of his major works had been published at the time of his death, and the unpublished manuscripts were in the possession of his friend Max Brod; Kafka had instructed Brod to destroy everything upon his death, but Brod thankfully ignored this direction. Kafka's early demise at least saved him from the fate of his sisters, three of whom were murdered in the extermination camps of Nazi Germany.

In summary, four of the seven (Freud, Husserl, Mahler, and Kafka) were born in either Bohemia or Moravia, and the other three (Marx, Einstein, and Noether) in southern and southwestern Germany. Their birthdates span a period of sixty-five years; leaving aside Marx, the span for the remaining six is a mere twenty-seven years. Five of the seven (all except Noether and Kafka) came from small towns or villages, and all were raised in German-speaking communities. *And a mere sixty years after the youngest of them was born – Kafka, in 1883 – all of the communities from whence they sprang,*

¹ The case of Fritz Haber (1868–1934) illustrates many of the themes under discussion here. Born a Jew in Breslau (now Wroclaw), Haber converted to Lutheranism and became a strong German nationalist. He won the Nobel Prize in Chemistry in 1918 for developing the synthesis of ammonia from nitrogen and hydrogen; the Haber-Bosch Process created industrial quantities of synthetic fertilizer, and it is estimated that half of the human population is alive today due to its impact on agriculture and food production. (It also became a key component in high-explosive shells and bombs.) During World War I his nationalistic fervor prompted him to seek an officer's commission, then to weaponize chlorine gas and personally supervise its release against enemy soldiers on both the Western and Eastern fronts. In the early 1920s scientists working in Haber's lab at the Kaiser Wilhelm Institute developed a cyanide-based pesticide commercialized as Zyklon A; its successor, Zyklon B, was used to kill millions in the Nazi extermination camps. At the University of Berlin Haber and Einstein became close personal friends despite their sharply differing political views, but Haber dutifully voted to terminate Einstein's membership in the Prussian Academy after Einstein fled Germany in 1932. He himself lost his university professorship in 1933, despite Max Planck's attempt to intervene on his behalf directly with Hitler by recalling Haber's service to the German state (Hitler told Planck, "A Jew is a Jew"), and he died in exile in Switzerland the following year.

which had existed in many cases for more than five hundred years, were extirpated, root and branch, and their entire populations wiped out, in the maelstrom we know as the Holocaust. The Nazis were known for nothing if not their methodical thoroughness.

As adults, most of the seven (all except Kafka and Husserl) became exiles from the lands of their birth. Marx, having moved around Germany, France, and Belgium for a number of years in the 1840s, harassed by various political authorities, finally fled to London in 1849, where he spent the rest of his life. Freud was still living in Vienna in 1938 when the *Anschluss* – the annexation of Austria by Nazi Germany – occurred, and was allowed to leave for London only after France’s Princess Marie Bonaparte paid the exorbitant “flight tax” levied on him by the Nazi authorities. Persistent and vociferous anti-Semitism finally drove Mahler out of Vienna in 1907, when he moved to New York to conduct the Metropolitan Opera and the New York Philharmonic Orchestra; he fell seriously ill in New York in late 1910 and died almost immediately after arriving back in Vienna in early 1911.

Einstein had faced death threats and public denunciations in Germany throughout the 1920s. He was in Berlin in 1922 when his good friend Walther Rathenau, then Germany’s Foreign Minister, was assassinated, and he left the land of his birth for the last time in late 1932 to settle in the United States, just ahead of Hitler’s accession to power, vowing never to return.² Emmy Noether, having been dismissed from her low-

² A wonderful treasure from this period is the *Born–Einstein Letters*. Einstein’s close friend Max Born (1882– 1970) was, like Haber and Immerwahr, a Jew born in Breslau (Wroclaw) and became one of the great geniuses of atomic physics during the 1920s, known among other achievements as one of the founders of quantum mechanics. Like so many others he left Germany after 1933 and became a professor at Edinburgh before returning to Germany in his

level teaching position at the University of Göttingen in 1933, also settled in the United States, where she tragically died from complications following surgery only two years after finding a safe haven. Husserl died in Germany in 1938, after having had his university privileges as a retired professor revoked in 1933; had he lived a few years longer, he would have been persecuted and perhaps killed, since old age was no barrier to torment for Jews in Nazi Germany – some too aged and infirm to leave their beds were carried from their homes, bedding and all, to the trucks waiting to take them to the camps. Had Kafka (who was only forty-one when he died in 1924) lived on for another two decades in his native Prague, would have been either forced into exile or murdered like his sisters.

Remarkably, five of the seven came from communities lying along latitude 49° N, and three of them – Freud, Husserl, and Mahler – were born only four years apart in villages stretching from eastern Bohemia to eastern Moravia and lying virtually in a straight line about 200km from each other. Some other interesting coincidences unite the seven. Marx and Freud both died in exile in London, albeit many years apart. Freud and Mahler grew up in Vienna, which by the late nineteenth century had become a hotbed of anti-Semitism under its notorious long-serving mayor, Karl Lüger. (In general, throughout the late-nineteenth and early twentieth centuries popular anti-Semitism was far worse in Austria than it was in Germany itself, and due to his high public profile later in life Mahler in particular suffered from it.) During his existential crisis over his marriage to Alma, Mahler travelled to consult Freud at the latter's vacation spot in Leiden in southern Holland in the summer of 1910. Einstein spent the academic year of 1911/12 at the University of Prague, where he became acquainted with Max Brod, Kafka's faithful friend; we cannot be sure that Kafka and Einstein ever met, although Kafka did occasionally attend the meetings of Jewish intellectuals frequented by Brod and Einstein. Einstein knew and greatly admired Noether and her work, and both ended up in exile in the United States.

retirement. He and Einstein never saw each other again after both emigrated, but thankfully their extraordinary wartime correspondence survives.

My story about this set of seven figures is used here in a symbolic rather than an evidentiary sense. Of course, there were other as yet unmentioned late-nineteenth-century pathways to modernity not represented here – in painting and sculpture, for example, as well as in theatre and dance; in many other disciplines in the human sciences; in the concepts of evolution and electromagnetism; in chemistry, geometry, architecture, and more. And there were many other major figures of great genius, non-Jews and Jews alike, who forged its key tenets in art and thought.

The century after 1850 in the Western world (Europe and North America) saw a stunning matrix of changes in economy (large-scale industrialization), politics, society, culture, and the sciences. It turned out to be a very mixed blessing indeed. For the matrix of changes had a double aspect: On the one hand, it represented a powerful amplification of the eighteenth-century French Enlightenment, with strong progressive currents in politics, society, culture, and the sciences (natural and human). On the other hand, there was a terrifying reaction against all these innovations, against democracy, against the new culture (called “degenerate”), against tolerance and individual freedom, against even modern science itself. That reaction was at first weak and faintly ridiculous, marked by the hysterical rhetoric and pathetic strutting of demagogues. But when it was finally consummated in Hitler’s new order, there was revealed a “solution” to the hatred of modernity so harrowing, so brutal, so all-encompassing, and so pitiless that it has proved hard for succeeding generations to fully come to terms with its utter depravity.

To borrow a term from the German military theory of *Blitzkrieg*, what one looks for in a swelling movement of ideas that succeed in smashing the defenses erected around older and sclerotic intellectual systems is the *Schwerpunkt*: the battering-ram,

the concentrated mass of forces that achieves the decisive breakthroughs. The story related here suggests that the *Schwerpunkt* in all this stunning intellectual development occurred among the German-speaking peoples in Western and Central Europe. And it was the tragic fate of the Jewish communities there to embody, more clearly than any other identifiable ethnic grouping, that *Schwerpunkt* – to help mightily to lead the progressive forces, and then to suffer disproportionately the full, awful consequences of the backlash against them. The clash is best symbolized in Germany during the decade of the 1920s. The one side featured the growing power of Hitler's storm-troopers and his hateful propaganda. Meanwhile, that same nation was at the center of the most fateful new field in the natural sciences, atomic physics (where about one-third of the most important findings, and the Nobel Prizes that celebrated them, were attributable to Jewish scientists); and it was also the location of the city of Berlin, where the avant-garde in arts and culture had their wares on display.

Towards the end of the nineteenth century many physicists had believed that their discipline was fully completed, and that there was nothing of importance to be newly discovered. This was a typical expression of the pervasive cultural and intellectual smugness in the dominant culture of that time – and the political smugness as well, illustrated by the view that major wars were a thing of the past for the European nations. Yet just as the new century began to unfold, the seven figures profiled here, and their many contemporaries, were tearing down the intellectual and cultural edifices they had inherited. After another decade had passed, World War I shattered the prevailing social institutions and political structures of Europe.

Europe was at the center of the historical development of modernity, and the German-speaking world formed its core. The coming of modernity involved the dissolution of traditional and seemingly stable forms of thought and artistic expression that had been dominant for centuries prior, across a truly breathtaking range of forms:

- In cosmology, grasping the true and astonishing spatial and temporal dimensions of the universe;
- In physics, Einstein's relativity and the concept of space-time, replacing the

intuitively more familiar Newtonian scheme;

- In subatomic physics and quantum theory, an entire world of unusual natural processes fundamentally at odds with the nature we apprehend with our senses;
- In geology, the vast time-expansion of the earth's biography and its profound changes in climate and physical topography;
- In psychology, Freud's theory of the subconscious and of a set of chaotic, hidden mental processes underlying personality, culture, and social dynamics;
- In popular music, jazz, and in classical music, the development of atonality;
- In painting and sculpture, the dissolution of familiar forms of the human body and the natural world in impressionism and expressionism;
- In architecture, the *Bauhaus*;
- In Kafka's prose, the undermining of the individual protagonist's autonomy within the obscure workings of bureaucracy;
- In evolution, the shattering of the myth of one-time human creation and its restricted time-dimension by the idea of continuous natural selection;
- In family matter, challenges to gender roles and relations.

There is more, and the process goes on: By now, even the idea of rigidly-fixed gender is gone!

And no short passage better captures the underlying conception of this new world-view than this one, from Max Born's 1954 Nobel Prize lecture in Stockholm:

I believe that ideas such as absolute certitude, absolute exactness, final truth, etc. are figments of the imagination which should not be admissible in any field of science. On the other hand, any assertion of probability is either right or wrong from the

standpoint of the theory on which it is based. This loosening of thinking (*Lockerung des Denkens*) seems to me to be the greatest blessing which modern science has given to us. For the belief in a single truth and in being the possessor thereof is the root cause of all evil in the world.

This has been a truly radical transformation, playing out across a century or more, affecting the way we see the world in science and art as well as the way we understand the human person, and following thereon, the implications of these changes for social relations. But new forms do not render the old ones useless or unimportant: We can still derive immense pleasure and insight from the earlier phases of classical music and painting, and even Einstein's new cosmology does not abolish Newtonian physics. (This is not the case across the board, to be sure; in some areas, such as psychology and evolution, the new ways of thinking render the older ones obsolete.)

What the new forms do is to present a radical challenge to the limitations on thought and sensibility represented by the older ones, and to present a broader and deeper apprehension of ourselves and the world. And precisely because the constructions of modernity were so thoroughgoing and radical in their challenges to established forms, *the eventual reaction against them in Nazi ideology was equivalent in its radicalism both in breadth and depth*. This reaction did not limit itself to repealing what had happened in the previous half-century; on the contrary, it recreated an ideal of society and its leadership cadre that leapfrogged all the way back to medieval times!

This blueprint can be seen most clearly in the activities and plans for the future carried out during the war years by SS leaders under Himmler's authority. These plans and activities included:

- 1) resettling all of the Soviet Union up to the Urals (after exterminating some of the existing population and enslaving the rest) with landed agricultural estates owned by German "soldier-farmers," living in medieval-style houses, who would sow ancient grains and tend ancient cattle breeds;
- 2) creating a SS training academy in a castle at Wewelsburg, furnished with items including a shrine dedicated to the Holy Grail and artifacts

from Roman and Bronze Age tribes;

- 3) spending vast funds on researching the origins of the “Aryan” race, including sending an expedition to Tibet.

The better-known abusive reactions of the regime to modernity included labeling relativity theory as “Jewish physics,” proscribing most twentieth-century classical music and jazz, and creating a “museum of decadent art” (of course, this did not prevent kleptomaniacs among the regime’s grandees, especially Göring, from stealing truckloads of valuable modern paintings from their Jewish owners).

The most salient fact about the hatred of modernity in Nazi ideology was its obvious impotence. Neither on an intellectual nor an aesthetic level did this opposition mount – or even really try to mount – any kind of meaningful response to what it condemned. What aesthetic responses existed were either banal, kitschy or backward-looking, some examples of which are the sculptures made for Hitler’s chancellery and especially Speer’s grandiose designs for massive buildings to be built in Berlin, Linz, and elsewhere. On an intellectual level the responses were even more pathetic, as Nazi ideologues tortured people, facts, iconography, and history in attempting to reinforce their bizarre racial and medical theories. No new scientific discoveries of any kind were made, partly because some genuine scientists such as Otto Hahn refused to continue his work, and even Heisenberg’s attempt to build a working nuclear reactor using controlled fission – a necessary prelude to making an atomic bomb – was simply amateurish.

Thus, there was no effective or meaningful creative outlet for the Nazi rage against modernity in the realms of thought and art, nothing at all which could be

pointed to as representing either a satisfying vindication of the campaign itself or a clear sign of its triumph. Only one avenue remained open for discharging the contents of that immense psychic reservoir of inarticulate hatred and suppressed self-loathing with which the Nazi mind was filled to overflowing. That avenue was the attempt to carry out the complete extermination of European Jewry. Hitler's rhetoric abounds with an indictment of the Jews as the source of all the ills of the modern age, but the bill of particulars was always an inchoate miscellany of bizarre lies that never even rose to the level of half-truths. To ask for more convincing evidence to support the case would have been, of course, beside the point. To be sure, the pervasive, ancient, latent, ever-stirring antisemitism rooted in Christianity had prepared the way, but this time was different. As Franz Werfel wrote – about other, similar events – in his 1933 novel, *The Forty Days of Musa Dagh*, his unwitting anticipation of the Holocaust: “The old sporadic fanaticism of religious hatred had been skillfully perverted into the cold, steady fanaticism of national hate.

From its beginnings, this trial was never about how convincing the evidence of guilt was. Rather, it was about generating a process of thoroughgoing social and institutional mobilization within German society that would be sufficient to allow the leadership to implement unopposed the *Endlösung* (the “final solution” to “the problem of the Jews”). The details of German history from 1933 to 1944 show how carefully and methodically Hitler and his henchmen undertook this mobilization. It proceeded in fits and starts, during the first phase known as the time of persecution, starting with the initial wave of repression soon after the accession to power, sending some Jews and others to the first concentration camps, then the racial law in 1935, *Kristallnacht* in 1938, and many other steps; in between those steps there were periods of quiescence, which lulled the eventual victims into false hopes. Even the minor forms of harassment had an utterly heartless character, such as the order banning Jews from owning household pets, leading to the spectacle of weeping people bringing their dogs, cats, and birds to places where they would be killed.

The second phase, the period of extermination, also developed in stages at first – but after the “Wannsee Conference” in early 1942 it was to accelerate rapidly. Earlier there had been much speculative discussion within the regime about other “solutions,” notably the proposed mass deportation of European Jews to the island of Madagascar, where they would be allowed to starve to death, a plan which could not overcome the prospect of confronting the might of the British Navy. But a powerful accelerant had been added in the middle of 1941, namely the fact that huge numbers of Jews in eastern Poland, the Baltic States, Ukraine, and Russia had newly and suddenly fallen under Nazi control after the invasion of the Soviet Union, far more Jews than the total existing in all of Western Europe.

By early 1942 the institutional mobilization for extermination had been completed. The security service (SS and SD) had an iron grip on the population, both within Germany and throughout the occupied nations, and took the lead under the command of Reinhold Heydrich and Heinrich Himmler. The officers and soldiers of the *Wehrmacht* on the Eastern Front, including at the most senior levels of command, had been conditioned to play their supporting role; the mobile extermination squads were already active in the East, carrying out mass shootings; the concentration camps for the exploitation of slave labor were expanding rapidly in number and size; and experiments were under way to determine the most efficient methods for mass murder on a scale never before contemplated in what was once a civilized nation. Even the euphemisms designed to disguise the enterprise had been devised.

When a sufficient level of mobilization had been attained, this countervailing, sinister *Schwerpunkt* came into being: A concentrated mass of overwhelming military

and police power, supported by a broader administrative bureaucracy, devoted to achieving a single objective, one that had no precedent (so far as I know) in earlier human history – namely, the complete extermination of an entire people and its culture.

From the westernmost borders of Europe eastwards into the depths of Russia, from Norway's far north southwards to the boot of Italy, a gigantic machinery, operating at a frantic pace, was set in motion, which spared no effort or cost and had substantially realized its objective within a mere three years. The centrality of this single objective to the regime's conception of itself is revealed in the last major phase of its operations. In June of 1944 the Allied landings in Normandy were matched on the Eastern Front by the Red Army's "Operation Bagration" (launched to the day on the third anniversary of the German invasion); thereafter the military conquest of Germany by these combined armies was only a matter of time. When the Red Army paused to resupply a few months later, it had destroyed once and for all Germany's Army Group Centre, its most powerful military formation, and had arrived at the eastern borders of the Reich and of Hungary. And what had the Germans been doing in the meantime, with their nation coming under mortal threat from its sworn enemies? During a mere two months after May 15 of that year almost half-a-million Hungarian Jews were rounded up and deported to the extermination camps in Poland and summarily gassed and burned.

The kind of historical dialectic outlined here – the way in which a radical movement of thought and sensibility, challenging centuries-old established traditions, elicited a horrifying and equally radical reaction – is not without historical precedent. For example, monarchs seeking to uphold the Catholic Church's monopoly of "spiritual" power and authority against the challenge of Protestantism unleashed a bloodbath on the European continent during the Thirty Years' War in the seventeenth century. Yet the differences between these two are not trivial. The twentieth-century case occurred in the context of greatly enlarged human powers brought by modern science and technology and its supporting structures – bureaucratic and administrative organization, advances in mass communication and mass destruction, and the sheer geographical reach of conflict. The four years of bitter struggle between Nazi Germany and the Soviet

Union was the largest and most destructive war in human history. And by no means did all of the horrors either contemplated or attempted by Hitler actually come to pass; the war had a number of decisive turning-points, the outcome of which was a close-run thing. It could have been even much worse than it was.

It was the terrible fate of the European Jews, whose impoverished and oppressed communities had given the world so many of the creative geniuses – out of all proportion to their numerical share of the larger population – who had helped to bring modernity into being, to suffer and die – again out of all proportion – without ever knowing why they had been singled out: Rounded up without warning and taken by the thousands to be shot on the edge of hastily-dug pits; or thrown out of their homes by the tens of thousands, stripped of their possessions, crammed into cattle-cars without food or water, families torn apart at the selection points at the camp's entrance amidst barking dogs and the screams of armed thugs, shorn of their hair, and shoved naked into sealed cellars, until choking on the deadly gas they were finally released from the terrors of their last days.

Paul Antschel (1920-1970), who wrote poetry under the name Paul Celan, was a member of the Romanian Jewish community whose parents died in a Nazi concentration camp. Following is the final stanza of his famous poem, “Death Tango” or “Death Fugue”; the poem was recited in its entirety in the German Bundestag in late 1988, on the fiftieth anniversary of *Kristallnacht* – the “Night of Broken Glass,” which occurred on 9 November 1938:

Black milk of daybreak we drink you at night
we drink you at noon death is a master from Germany
we drink you at nightfall and morning we drink and drink

death is a master from Germany his eye is blue
he strikes you with leaden bullet he strikes you true
a man lives in the house your golden hair Margarete
he sets his dogs on us he gives us a grave in the air
he plays with the serpents and dreams death is a master from Germany

For those in the camps the savage torment they endured did not end for them even upon their death, as other prisoners (whose turn would come) yanked the teeth from their corpses in search of gold fillings.

The historical agony of modernity and the reaction to it is not finished. More recently radical Islam presents the same kind of *totalizing* rejection of the modern, not just new ways of thought and expression, but the entirety of the new form of social relations, above all the position of women in the family and public life. The same kind of backward-looking utopia motivates its adherents. In his congratulatory message to his followers after the 2001 attack on the World Trade Center, Osama bin Laden extolled the memory of "Al-Andalus," the great Muslim civilization in Spain which flourished from the eighth to the fifteenth centuries. The Islamic State seeks to revive the long tradition of the caliphate in the Arab world, where political and religious rule were completely merged. Wahhabism, the severely conservative form of Sunni Islam which Saudi Arabia's oil money has promoted throughout the Islamic world, reaches back through an eighteenth-century preacher to its roots in medieval theology. Their Shia brethren in Iran long for the return of the Mahdi, the twelfth Imam, last seen in the ninth century, whose second coming will usher in the hoped-for end of days.

And at the core of the violent political hatreds expressed by both extremist forms of Islamism – Arab and Persian, sworn enemies of each other – we find not only the values of modernity but the State of Israel. At times, it seems inevitable that this hatred must explode anew in a bloody conflict that consumes the entire region.

APPENDIX: A NAZI PHILOSOPHY OF DEATH

A book by the French scholar Emmanuel Faye contains the following passage (on page 305) from one of Martin Heidegger's four so-called "Bremen Lectures," written in 1949

and entitled "The Danger." (The original German of this passage, taken from volume 79, page 56 of Heidegger's *Gesamtausgabe*, is quoted in the footnote section of Faye's book on pages 406-7.)

"Hundreds of thousands die *en masse*. Do they die? They perish. They are put down [*umgelegt*]. Do they die? They become supply pieces [*Bestandstücke*] for stock in the fabrication of corpses. Do they die? They are liquidated unnoticed in death camps. And also, without such -- millions in China sunken in poverty perish from hunger. But to die means to carry out death in its essence. To be able to die means to be able to carry out this resolution. We can only do this if our essence desired the essence of death. But in the middle of innumerable deaths the essence of death remains unrecognizable. Death is neither empty nothingness, nor just the passage from one state to another. *Death pertains to the Dasein of the man who appears out of the essence of being.* Thus it shelters the essence of being. Death is the loftiest shelter of the truth of being, the shelter that shelters within itself the hidden character of the essence of being and draws together the saving of its essence.

"This is why man can die if and only if being itself appropriates the essence of man into the essence of being on the basis of the truth of its essence. *Death is the shelter of being in the poem of the world.* To have the capacity for death in its essence means to be able to die. Only those who can die are mortals in the apposite sense of the word."

The Nazi regime used the phrase *Lebensunwertes Leben* ("life unworthy of life") for those fit only for extermination. What can one say to this passage from Heidegger's postwar writings except: *Is it not fitting that those who while alive were deemed to be a form of "life unworthy of life" should, at the brutal termination of their existence in the extermination camps, be deemed to have suffered a death unworthy of death?* In the passage quoted above, the imprecision and allusiveness of the author's prose is put at

the service of a train of thought that is shocking in its overt indifference to suffering and injustice, but perhaps less shocking in the case of an unrepentant servant of Nazism who had willingly configured his own philosophy to make it accord with that evil regime's basic tenets.

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Figure 1, *Euler's Identity*: https://en.wikipedia.org/wiki/Euler%27s_identity
Leonhard Euler (1707-1783) was a Swiss mathematician and physicist, and this has been described as “the world’s most beautiful equation.” It was one of the formulae shown to fifteen mathematicians in a neuroscience study using MRI scanning of the brain. The study found that in the subjects’ brains the medial orbitofrontal cortex was stimulated; this is part of the ‘emotional brain’ in which we experience aesthetic pleasure such as music: S. Zeki *et al.*, “The experience of mathematical beauty and its neural correlates,” *Frontiers in Human Neuroscience*, vol. 8 (February 2014), pp. 1-12. The quotation from Dirac in Chapter 8 will be found towards the end of this article:
<http://journal.frontiersin.org/article/10.3389/fnhum.2014.00068/full>

Results of voting: BBC survey asking what was the most beautiful equation ever written:

- The Dirac equation, 22,913 votes, 34%
- Euler's identity, 11,383 votes, 17%
- Pi, 9,060 votes, 13%
- Riemann's formula, 3,615 votes, 5%
- The [Schrödinger] wave equation, 3,318 votes, 5%
- The Euler-Lagrange equation, 2,663 votes, 4%
- Bayes' theorem, 2,590 votes, 4%
- The Yang-Baxter equation, 1,382 votes, 2%

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