

The Price of Science without Moral Constraints: German and American Medicine before DNA and Today

Robert E. Pollack

Abstract: Robert E. Pollack asks how physicians and scientists in Germany could have found themselves party to a sequence of events that began with sterilization of people with disabilities, became selective euthanasia, and wound up killing about half a million Germans designated as “lives not worth living,” all before the outbreak of the war in 1939. He then asks whether and if so, to what degree, we are vulnerable to making these mistakes today.

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Robert E. Pollack

*“Das Sein ist ewig; denn Gesetze
Bewahren die lebend'gen Schätze,
Aus welchen sich das All geschmückt.”*

(“Being is eternal; for there are laws to conserve the treasures of life, on which the Universe draws for its beauty.”)

Goethe

“Hell is truth seen too late.”

William Sloane Coffin

We cannot know which works of the first five years of this century will turn out to define our sense of ourselves as human beings. There is no doubt in my mind which three works defined the nature of human individuality a century ago. Two were books published by already established experts in matters of the brain and mind: Sigmund Freud’s *On the Interpretation of Dreams*, and William James’s *The Varieties of Religious Experience*. Both shed light on the innermost recesses of the mind and its least rational and logical components, bringing matters of individual conscious and unconscious thought into the world of data.

The third was a paper in the December 13, 1904 issue of the British medical journal *Lancet*, called “The incidence of alkaptonuria: a study in chemical individuality,” by one Archibald E Garrod, M.A., M.D. Oxon., F.R.C.P., lond. Garrod’s paper brought together, in the service of medicine, the insights of the two major biologists of the mid-nineteenth century: the Anglican minister’s son Charles Darwin, and the Czech monk Gregor Mendel.

Darwin’s *Origin of Species* gave us the notion that our species was neither created *de novo* nor would it

last forever; rather, having emerged from wholly natural origins, it would one day die or be supplanted by other species in turn. Further, Darwin was able to explain this through a process of natural selection that rejected all Platonic ideals, and depended only on inherited variation from one individual to the next. Mendel’s work on the inheritance of color and form in the seeds, stems and flowers of sweet pea plants had provided a set of statistical rules for predicting the inheritance of the very differences that natural selection presumably built upon. Neither Mendel nor Darwin had any good notion of how inheritance might work. Guesses are never a good idea, and not surprisingly, Darwin’s guess—that the pressure to survive generates the variations that will survive—was quite wrong.

Today we know with very high confidence that the genetic variation fueling natural selection arises at random by failures in the replication of the genetic molecule DNA. Yet in the glow of his larger success at explaining so much about the living world, many other scientists built large intellectual edifices on Darwin’s faulty genetic foundations. The English scientist John Galton was perhaps the most widely appreciated of these; in 1864 he

¹ I thank Ruth Cameron, Christine Tietz-Steiding, Alisa Frohman and Kathleen Kehoe for assistance with archival material.

coined the word eugenics, from the Greek for “well-born,” to describe the agenda of directed human breeding that would eliminate the “weak” and “undesirable” components of human inherited variation.²

Enter Garrod in 1904. Noticing the patterns of family inheritance of a chemical difference that caused a newborn infant’s diapers to turn black, Garrod was able to see that, unexpectedly, every aspect of a person’s individuality might be available for study as a chemical difference as well. Further, he was able to show that one—and by extension many, if not all—of these chemical differences gave expression to simple genetic differences; that is, that Mendel’s laws applied to us as well as to peas. Despite the atomistic simplicity of Mendelian “yellow pea or green pea” inheritance, the statistical bent of Galton and the early eugenicists had already become fused with the widely-held alternative model of fluid inheritance by “dilution of ancestral blood.” The contradiction between the models of “fluid” and Mendelian inheritance did not inhibit patriots in several countries, who could and did argue that the new science of human genetics now gave them the tools for a rational plan to improve the genetic quality of a nation.

In the first part of the last century, the eugenics movement brought together some of the best geneticists and physicians and worst tinplate chauvinists in the Western world. It was—and for some people still is—easy to endorse their initial agenda: civilized people have an obligation to minimize the number of defective versions of genes in their chromosomes and in those of their descendants, replacing them with good, better, and best versions.

Some eugenicists, however, were impatient with simple testing and counseling. Would it not be easier to cultivate the best selections of human genes, they asked, if the wasteful, genetically risky

business of having children were put under rational control, and easier still if the results of genetic analysis were fed into a state apparatus that would decide who could be born and who not?

“Only twenty years before Hitler came to power, eugenics was a recognized, legitimate branch of genetics.”

It is easy to see—standing on a mountain of ashes, watching world leaders shiver in the snow at the sixtieth anniversary of the liberation of the remnant of survivors of Auschwitz—where the scientists and doctors of Germany went off the deep end. But only twenty years before Hitler came to power, eugenics was a recognized, legitimate branch of genetics, and in Germany, the United States, and many Western countries it drew the attention of reasonable, educated people at the very highest strata of society. Here, for instance, is United States President Woodrow Wilson, writing in his “History of the American People” of the shift in immigration to the United States at the turn of the twentieth century, just as the Eugenics movement was gaining force:

Throughout the [nineteenth] century men of the sturdy stocks of the north of Europe had made up the main strain of foreign blood which was every year added to the vital working-force of this country or else men of the Latin-Gallic stocks of France and northern Italy, but now there came multitudes of men of the lower class and men of the meaner sort out of Hungary and Poland—men out of the ranks where there was neither skill nor any initiative of quick intelligence ...³

Andrew Carnegie, whose free libraries grace New York and many other cities, was a generous and enthusiastic supporter, as well, of the international eugenics movement. He founded the Carnegie

² For a recent short summary of Galton’s work, see Holt, J., “Measure for Measure,” 2005, *The New Yorker*, January 24 and 31, p. 84.

³ Wilson, W., “History of the American People, (19XX), v. 5, p. 212. Quoted in Garis, R. “Immigration Restriction,” (1927), Macmillan, New York, p. 216. “Hungarians and Poles” nicely summarizes the ancestry of my grandparents and those of my wife, and indeed none of them were able to attend school in the United States, nor did our parents ever go beyond grade school.

Station for Experimental Evolution at Cold Spring Harbor, Long Island, at the turn of the century. Charles Davenport, the director of the Cold Spring Harbor laboratory in the 1920s, contributed heavily to Congress's decisions in that decade to restrict immigration to the United States on "national" grounds. His testimony before Congress, and that of others, was full of eugenic contentions couched in the most scientific tone; for example, alcoholism, poverty, and avarice were argued to be "genes" inherited by people born of Irish, Italian, and Jewish parents, respectively.⁴

The inaccuracy, intellectual sloppiness, and prejudices of scientists like Davenport and like-minded members of Congress converged in the Immigration Law of 1926, which codified the most crudely racist and biologically foolish distinctions since the Constitution's definition of a slave as 60% of a human being. By the 1940s, this eugenically correct law had blocked the escape to the United States of many people who subsequently died in actions carried out according to the more activist laws of the Third Reich.

Germany was the country most hospitable to the eugenics movement in the 1920s and 1930s. As they thought of ways to accomplish the "weeding and seeding" of human genes, German eugenicists were first assisted, then taken over, by a political movement, a government, and a leader all driven by the crudest and most naive notions of national and racial purity. In that time and place it was only a short walk for many physicians, and for some professors of psychiatry, anthropology, zoology, and genetics, to go from theories of eugenics to the practice of mass murder.⁵

Their downward spiral can be reconstructed from their writings and from the grim record they left behind in other ways. It began with an appreciation of Garrod's discovery that certain inherited differences among people—recessive ones—reappear unexpectedly after generations of silence.

It went from there through ambiguous clinical observations that certain mental diseases and physical deformities might be inherited in this way, to acquiescence in the nonsensical notion that some versions of some genes reflected national boundaries and religious distinctions. From there it went to the endorsement of the even more bizarre notion that within a country, a measurable set of versions of genes marked the national "type," so that persons whose appearances, behaviors, cultures or religions revealed their lack of these versions of their genes, could never be brought into the national fold by naturalization, nor by conversion.

"German eugenicists were first assisted, then taken over, by a political movement, a government."

From there it became simply a matter of new law, that a life without proper national genes was simply not worth living, and from there it was only obedience to the law that led to participation in the banning of marriage, then the sterilization, and then the murder, of hundreds of thousands of people in Germany presumed—on the basis of such markers as the desires of their heart or a history of epileptic episodes—to lack these versions of genes in their chromosomes. In the years between Hitler's rise to power and the beginning of World War II, hundreds of thousands of Germans hospitalized with various genetic and mental ailments, others afflicted with alcoholism and the like, and still others with no particular problem but who were attracted to people of the same sex, were sterilized without their knowledge or acquiescence but with the agreement of their doctors.

The first wave of American eugenics was bad science, and it caused a lot of suffering before it ran its course, but at least it was stopped short of completely overriding the American notion that acquiring citizenship was a matter of laws and not

⁴ For more information, see Kevles, D., "In the name of Eugenics: genetics and the uses of human heredity," 1985, Knopf, New York.

⁵ For more information, see two books on the subject from widely different perspectives: Weinreich, M., *Hitler's Professors*, second edition 1999. Yale University Press, New Haven, originally published in Yiddish in "YIVO Bleter," 1946; and Proctor, R., *Racial Hygiene: Medicine Under the Nazis*, 1988, Harvard University Press, Cambridge.

genes. The European eugenics movements of that period were not inhibited by such laws; in many countries eugenicists were given strength and legal standing by laws that inextricably linked full citizenship to notions of race and "blood." This coincidence of political and eugenic agendas helped eugenics in Germany to go off the tracks, derailed by an explosive combination of two mistakes.

The first was the belief that an ideal human type exists. As a piece of science this makes little sense, flying as it does in the face of the first tenet of natural selection, that the survival of a species over the long term will depend above all on the existence of a maximum of variation from individual to individual. However, the notion took hold, and from it came the German eugenicists' notion of *Ballastexistenzen*, or "lives not worth living." With the invasion of Poland in 1939, sterilization was succeeded by wartime euthanasia. Many Germans died in hospitals and nursing homes by gas and lethal injection. When they were done, the killing squads were vetted to new jobs in the concentration camps of the East.

"Political agendas helped eugenics in Germany to go off the tracks."

The second mistake arose from the notion that versions of genes would identify an individual whose appearance approached a national ideal. In order for a program of controlled reproduction to be effective, ideal human types had to breed true. Appearances are more certain to breed true when they require the inheritance of two copies of the same version of a gene, one from each parent. These are the so-called recessive versions, because inheriting only one copy does not produce the desired appearance; rather, it recedes in the presence of another version of the gene that generates a different appearance. The versions of genes that show their effect when only one copy is inherited from one parent—dominant versions—cannot produce the surprise-free stability of behavior and appearance needed for a breeding agenda.

When German eugenicists planned to breed for versions of genes producing appearances of tall height, blue eyes, straight blond hair, small ears, and a small nose, they chose appearances requiring recessive versions of many relevant genes from each parent. Each ideal appearance could, at any generation in the future, be overwhelmed by the inheritance of a single unwanted but dominant version of a gene. These might well come from short, dark-eyed, curly-haired, large-eared, long-nosed people, who might well have been around for a thousand years or more, ignoring or even enjoying their differences from these presumptive Ideal appearances. That was enough to ignite the interest of Hitler—and anyone else in power as short and dark as Goebbels was—who had notions of ethnically cleansing Germany of such people in order to build a "master race" of tall, blond, blue-eyed people.

Under Hitler the next step—marshaling the efforts of a nation behind a program of human breeding for recessive appearances—needed only one piece of scientifically meaningless, emotionally charged nonsense to throw the whole enterprise into malignant focus. This was the notion that in addition to all appearances, every Jewish potential parent was inevitably the bearer of an undesirable, alien, dominant version of a gene that would crush the ones Germany needed, the crazy idea that Jewishness was a single version of a single gene. However inarticulately stated by Hitler's propagandists, and however confused it was by residual notions of "blood inheritance," this was the academically certified eugenic argument for the destruction by bullet, gas, and fire of German and then European Jewry, of Germans and others who had one Jewish grandparent, and especially of about a million Jewish children, some of whom, had they lived, would be exactly my own age today. (Figure 2).⁶

And what of today? The pathological application of eugenics in the Third Reich did not vaccinate us against other, similarly pathological, applications of biology to human affairs. Consider racism, the common use of skin color as a marker of

⁶ Id., figure 29, facing page 163.

complicated, partly inherited, partly culturally modulated aspects of human individuality, in particular the vastly complex and uniquely human traits of character and intelligence. This habit lives on even though there can be no impersonal, molecular shortcut to discovering a person's abilities.

Indeed, many medical conditions—and most traits we dislike or qualities we admire—are not the products of single versions of single genes, recessive or otherwise. To the extent that they are inherited at all, they are the consequence of the expression of large and unidentified assemblages of genes as well as of a lifetime of unpredictable interactions with other people. Even today, we can hear someone use the simple but scientifically ungrounded phrase “The gene for” a disease, to describe a damaged gene whose normal function is wholly interdependent with the normal functions of the rest of the entire genome, and whose expression depends on the person's entire life experience. A mutation associated with a disease would be “the gene for the disease” only if all the genes of the body, including the one in question, were not mutually responsible for the good health of a person. The false phrase “the gene for ...” is the ghost of eugenics, still haunting us all each time we hear it, or use it.

Less than a decade after the ashes of the Second World War had cooled, James Watson and Francis Crick were making tin and paper models of DNA and revealing the structure of the chemical differences—first imagined in Garrod's paper—that governed the inheritance of human individuality. In the half-century since, we have come to understand that DNA is a chemical text that instructs our bodies in all their operations while copying itself so faithfully that these instructions can be passed from generation to generation, enabling life to persist on our planet. These discoveries have revolutionized biology, and the study of genetics is now so complex and ambitious that it has spilled beyond the boundaries of science: human chromosomes, and the information carried by their DNA, will increasingly

guide and perhaps even direct our politics as well as our research in the next century.

“Some of the deepest assumptions of a free society have once again been called into question by the work of biologists.”

Meanwhile, some of the deepest assumptions of a free society—each of us is an individual; each of us has a private life; we are all equal under the law—have once again been called into question by the work of biologists. The worst risk posed by investigations into the workings of the human genome comes today from the explosive mix of nineteenth-century notions of eternal progress through science with twentieth-century notions of eugenics, because neither has been thoroughly expunged from our new and extraordinary power to change inheritance through the reordering of DNA.

We can expect the genetic component of human individuality to become larger as we learn how to track numbers of genes at once. Perhaps a thousand different human diseases have already been linked to specific versions of human genes, and there is every reason to suspect that mutations in many of the other thirty thousand or so human genes will also be associated with human disease in time. The temptation to apply basic research on the human genome first to medicine, then to social policy, and then to traditionally private choices is sure to grow with time as well.

Neither great fame nor a track record of profound scientific insight is proof against this temptation. Consider this report of Sir Francis Crick's 1968 Godlee Lecture, taken from a news article in *Nature*, the same journal that fifteen years earlier had published his and James Watson's discovery of DNA's structure and function:

“If new biological advances demand a continuous readjustment of ethical ideas, how are people to be persuaded to adapt to the situation? Clearly by education, and Dr Crick did not think it right that religious

instruction should be given to young children. Instead they should be taught the modern scientific view of man's place in the universe, in the world and in society, and the nature of scientific truth. Not only traditional religious views must be re-examined, but also what might be called liberal views about society. It is obvious that not all men are born equal and it is by no means clear that all races are equally gifted. ... So important it is to understand the genetics of human endowment that parents should perhaps be permitted, Dr Crick said, to dedicate one of a pair of identical twins to society so that the two twins could be brought up in different environments and compared.”⁷

“Do ‘new biological advances demand a continuous readjustment of ethical ideas’?”

But do "new biological advances demand a continuous readjustment of ethical ideas"? The human genome is a text, but not a sacred one. Even words held sacred by millions of people turn out to have many equally valid versions when examined closely; how much less likely is it that there will ever be a single, canonical human genome whose precise DNA sequences we might hold up as perfect, sacred, or even special? Yet that assumption underlies a significant portion of current biomedical research and development. Each newly isolated and sequenced human gene invites the speculation that we have been brought closer to understanding what the ultimate, supremely "gifted" genome would be. Every time science gives us a new chance to dream this way, we are all obliged—as bearers of different but equally valid versions of the human genome—to recognize the temptation, and to forswear it. Leaving the boundary between public and personal access to our genomes to the experts—biologists, physicians, lawyers, even Nobel laureates—will not do.⁸

In his great book on America, *The Irony of American History*, Union Theological Seminary's Reinhold Niebuhr wrote:

Nothing that is worth doing is completed in our lifetime, therefore we must be saved by hope. Nothing true or beautiful or good makes complete sense in any immediate context of history; therefore we must be saved by faith. Nothing we do, however virtuous, can be accomplished alone; therefore we are saved by love.⁹

Today, and for the foreseeable future, genetic medicine is the branch of science that depends on knowledge of many lifetimes, much history, and vast collaboration. The task will be to see that it is informed, as Niebuhr would have it, by hope, faith and love. Certain current practices in genetic medicine do not promise much of any of these three. Unless physicians and medical scientists—and their funders—accept their shared, human responsibility to attend to genetic matters in a context of hope, faith and love, every person will one day be obliged to pay attention to genomic news in a moment possibly not devoid of faith or love, but certainly devoid of hope.

There already are a few people who have had to deal with genetic news in this gloomy context. These are the descendants of genetic bottlenecks, members of groups of people—apparently unrelated—who share a small number of common ancestors. The Jews of Eastern Europe—the Ashkenazim—are one of these groups. How Jews and others respond to this challenge should be of interest to everyone whose recent family history includes the inheritance of unusual versions of one or more genes; that is, everyone.

The importance of each person's individual choices is central to the Jewish tradition, but it is nevertheless easy enough to lose sight of free will in the details of obligatory observance. The ancient Jewish recognition of a shared ancestry of all

⁷ Unsigned Article, "Love of Biology," *Nature*, vol. 220, pp 429-430.

⁸ For a list of five clear rules for protecting genetic privacy proposed a dozen years ago but still not enacted in any country, see Muller-Hill, B., *Human Genome Project: Ethics*, 1992, Foundation BBV, Bilbao, page 363.

⁹ Niebuhr, R. *The Irony of American History* (Scribners: New York 1952)

people produces a second, equally unquestioning presumption, one that emerges from the idea of a Day of Judgment: that the immeasurable, infinite value of each human life derives not from any aspiration to perfection, but precisely from the inherited differences that allow each of us to look different, and to choose differently, from all others.

The earliest part of the Talmud—the *Mishnah*—is a record of expectations and laws binding on Jews, codified almost two millennia ago. When I first began to speak on the utility of my own tradition to my science some years ago, my colleague Professor David Weiss-Halivni gave me a reference in *Mishnah Sanhedrin* (4:5) which has a commentary on the book of Genesis that makes this point with special elegance. The *Mishnah* is giving the reasons why witnesses to capital crimes must be taught that a person's life is at stake in their testimony, and that any person's life is a more serious matter than most anything else. The *Mishnah* then comments:

"...for this reason one individual Human Being was created...to proclaim the greatness of the Holy One the Blessed: for a man strikes many coins from one mold and they all resemble one another, but the supreme King of Kings, the Holy One the Blessed, stamped every human in the stamp of the first human being and yet not one of them is like the other. Therefore every person is obliged to say: the world was created for my sake."

What remains today of the certainty that “and yet not one of them is like the other?” At the deepest level of the letters in our DNA genomes, it is indeed the case that “not one is like the other.” Except for twins and other children who emerge from the same single fertilization of an egg by a sperm, any two people in this audience will have genomes three billion letters long that differ by about one letter in every few hundred.

Because the genome is so wonderfully long, even siblings have genomes that differ in millions of places. Genetic variation among parents and the iron rule of sexual reproduction—that in the

production of sperm or egg a choice will be made for every gene, with one version being discarded and one version passed on to the next generation—guarantee that while children of the same parents may resemble each other, they will not be identical unless they come from the same fertilized egg.

“The infinite value of each human life derives from the inherited differences that allow each of us to look different, and to choose differently.”

This raises an interesting question: if we are all so different from one another, why do siblings resemble each other more than any two people chosen at random? Brothers and sisters—and even cousins, who share grandparents rather than parents—look similar even though each is genetically distinct from the others, because their only genetic differences are taken from a very small number of choices, the particular versions of any given gene carried in their parents' genomes.

Even a three-generation family is genetically restricted by the versions of genes available from common grandparents, although the restriction is moderated for cousins by the genetic choices provided to each through a different second set of grandparents. That is why the resemblance among cousins is usually less striking than among siblings, but far greater than among two randomly-chosen people. The broad generalization that people look more different from one another the less they are related by recent common ancestry, also tells us that all members of our species were, over most of our shared history, quite happy to make babies with strangers.

Though each of us is a member of a very recent family that shares only a tiny fraction of the total human genetic diversity available, we are also all members of one family in the deep historic sense that our species has interbred widely for most of its history; that is why there are no versions of a gene that are present only in one place on the planet, and none that are wholly absent from any reasonably large population, no matter how isolated.

We Jews call ourselves a family, and in many ways—for better and worse—we act as if we were. We continue to preserve common laws, habits, language, texts and historical memories, as well as the belief that all of these are the gifts of an unknowable Deity who began our place in history by exchanging covenantal promises with three successive generations of our ancestors, Abraham's, Isaac's, and Jacob's.

We have preserved these shared habits and beliefs for millennia, over a large fraction of the populated world. They are the very model of strong ideas in action. They exemplify the durability and reality of religious belief in the unknowable, and the survival of belief in the face of millennia of strong negative selective pressure. Do these facts mean that the Jews of today are a biological family as well, linked by descent from shared ancestors?

“Until the closing decade of the twentieth century, many people could make the argument that the genomes of Jews must somehow be different from the genomes of all other people.”

The Jews of centuries ago who codified prayers understood that while being born a Jew was precious and important, it was not a necessary condition of being Jewish—conversion to Judaism made one part of the Jewish people—and it certainly was not sufficient. The central ideas and actions of a Jew have always had to be taught and learned, they have never been inherited. Nevertheless, until the closing decade of the twentieth century, many reasonable people could still make the argument—in the absence of evidence to the contrary—that since Jews accept the covenants made with Abraham, Isaac and Jacob, the genomes of Jews must somehow be different from the genomes of all other people, containing unique versions of many genes; that is, that Jews are a biological family.

The difference between "are Jews a family" and "do Jews all share the same versions of one or more genes" is that the second form of the question has a testable, precise answer. As no two

people have exactly the same version of the human genomic text, this claim could be confirmed or rejected by a search for versions of the human genome shared by all Jews and no other people.

Unfortunately the first group of scientists and doctors to pose the question in this way did so in a scientific context that reduced people to the bearers of their genomes, and in an inhumane manner that wound up being so painful, so cruel, and so lethal, that it is difficult to ask it again, even two generations after they were finally put out of business. In this historical context it is all the more remarkable that Jews all over the world flock to the new technology of DNA-based diagnosis, eager to lend their individual genomes—each a surviving data-point from the terrible experiment in negative selection—to a revisiting of this issue of biological Judaism.

Fortunately, this self-absorbed curiosity has provided sufficient genetic material to give a perfectly clear negative answer: there is no support in the genomes of today's Jews for the calumnious and calamitous model of biological Judaism. There are no DNA sequences common to all Jews and absent from all non-Jews, there is nothing in the human genome that makes or diagnoses a person as a Jew. But, as often happens when the tools of science are used in a medical context without a medical purpose, these same studies have raised unexpected difficulties in both medical, and religious, contexts.¹⁰

Given the great number of versions of each gene available in the human species at large, long runs of identical versions of genes in two unrelated people will never occur by coincidence. But because the population of Ashkenazi Jews who survived the pogroms of the mid-1600s in Central and Eastern Europe was so terribly small, and because it grew in an uninterrupted way from such small numbers, a large fraction of Jews today share such long stretches of genes with each other.

This was known in principle, but nevertheless the discovery a few years ago of identical stretches of

¹⁰ For example, see Pollack, R., "Some Genetics for Some Jews," 1992. *Conservative Judaism*, vol 54, page 3.

DNA hundreds of genes long, in hundreds of apparently unrelated people from all corners of the world, was a surprise. The people who offered their genomes for this landmark study shared only two things: an inherited tendency to have one's muscles twisting one about—called Idiopathic Torsion Dystonia—and an ancestor who had come from Jewish Central and Eastern Europe.¹¹

Most people in this study, but not all, called themselves Jews. Sometimes, though, members of an affected family would be shocked to discover that the inherited condition which had brought them into the study very likely meant an unexpected Jewish ancestry. With surprising regularity, when they understood the meaning of the tests done on themselves and their children, they would remember, admit—but not always accept—having Jewish ancestors.

“There are no DNA sequences common to all Jews and absent from all non-Jews, there is nothing in the human genome that makes or diagnoses a person as a Jew.”

The data from this study argued very strongly that the oddities of fate and the murderous intentions of strangers had fixed a history of near extinction four hundred years ago in the DNAs of the majority of Jews alive today. According to the scientists who carried out this study, the utter sameness of DNA in persons inheriting ITD world-wide means that every

Jew whose ancestors come from Ashkenazi lands—about nine of every ten Jews alive today—is the descendent of about 3000 families who survived the pogroms of the mid 1600s.¹²

It is terribly sad that these marks of history are sometimes called "Jewish diseases." There are no "Jewish" diseases, only the past consequences of violent anti-Semitism. Clearly, the shared genes of the Ashkenazim do not define any aspect of their Jewishness. Those descended from Ashkenazic ancestors share a higher-than-average frequency of versions of various genes, only because they are descended from the same survivors of Jewish Ashkenaz. The genomes of other Jews reflect their different histories. Descent from an Ashkenazi family, with or without its attendant inherited conditions, cannot make a person Jewish.¹³

Those who see any aspect of Judaism as inherited must be ignoring the demonstrated fact that Ashkenazim are descendents of a genetic bottleneck that did not afflict the pasts of the non-Ashkenazi families who make up the majority of the Jews of Israel. Israelis would certainly fail any biological criterion set by Ashkenazi history. Equally clearly, shared genes bring a shared fate: those Jews who do share a common Ashkenazi ancestry may not have inherited their Jewishness that way, but many have inherited a shared fate in the form of a genetic problem.¹⁴

¹¹ Risch, N., et. al., "Genetic Analysis of Idiopathic Torsion Dystonia in Ashkenazi Jews and Their Recent Descent From a Small Founder Population," 1995. *Nature Genetics*, vol 9, page 152.

¹² For a set of maps detailing the history of Jewish population growth and distribution, see Barnavi, U., *Historical Atlas of the Jewish People*, 1992.

¹³ Motulsky, A., "Jewish Diseases and Origins," 1995, *Nature genetics* vol 9, p. 99.

¹⁴ Kronn, D., V. Jansen, and H. Ostrer, "Carrier Screening for Cystic Fibrosis, Gaucher disease, and Tay-Sachs disease in the Ashkenazi Jewish population," 1998. *Arch. Intern. Med.* Vol. 158, p. 777. A recent pre-publication release of a report in the *Journal of Biosocial Research* by three anthropologists from the University of Utah, "Natural History of Ashkenazi Intelligence" has been taken by some as proof that indeed Jews are genetically different from others, and moreover, that because the differences are in the biology of intelligence, Jews are simply born smarter. But the paper says no such thing. In fact, it does not say anything in particular about Jews as a whole. As its title indicates, it is a paper about the intelligence of today's Ashkenazim, the people — Jews or the descendents of Jews who no longer consider themselves Jewish — whose ancestors arrived in Europe after the fall of the Second Temple, survived expulsions from England, France and Germany in the 1200s to 1400s, pogroms in Poland-Lithuania in the 1500s and 1600s, exterminations in Nazi-occupied Europe in 1939-1945, gulags and forced secularization in the Former Soviet Union until the 1990s, and are alive today.

This review of many studies from many laboratories presents some interesting findings about Ashkenazim today, and a testable hypothesis to explain them. The argument goes like this: first, that adult intelligence measured by IQ tests shows today's Ashkenazim to be about 10 IQ points sharper in quantitative and abstract skills than their non-Ashkenazic neighbors here, in Europe, and in Israel; second — forget Tevye, think Shylock — that for the 1500 years beginning about 600 CE,

The use of DNA data to make claims of inherited religious sensibility is inherently wrong. When those claims overlap medical issues, they allow for an extremely dangerous confusion to re-emerge from the dark recesses of eugenic history. When medicine confuses religious faith with biological ancestry and science links biological ancestry to genetic difficulty, then it is but a small slippery step downward for medical practice to mark out member of a religious group as genetically defective, *per se*. The eugenic odor will be familiar, as will the threat of it, but this time the tools are available to uncover evidence of common ancestry, and of common genetic difficulties, in any population, world-wide.

People—our species—are one family in precisely the same way that Jews are not. The story of Ashkenazi inherited diseases should make us all sensitive to the larger issues of inherited disease, and of genetic difference. Beyond the obligation this story tells us all to undertake—to accept the evidence and give up vain hopes of any religious birthright in their genes—is an even larger moral duty.

Ashkenazim could support themselves only in work that required ease and subtlety with numbers and abstract ideas; third, that this IQ difference is inherited as a greater brain size and complexity; fourth, that these biological differences are the expression of genetic differences that have the side-effect of producing some children with Ashkenazic inherited disease; and finally, that therefore the biological burden of the diseases associated with Ashkenazim—both the cancer-associated ones like BRCA-1 mutation and the nerve-cell storage diseases like Tay-Sachs—are the byproducts of 1500 years of externally-imposed genetic selection for high IQ.

There are many problems with accepting this case. First, it adds complexity to a simpler explanation, that is, that the Ashkenazim are the descendents of a small number of survivors of pogroms, and that these inherited diseases are not the byproduct of a useful thing like high IQ, but are simply the inherited token of ancient persecutions. Second, it argues for inheritance of some aspects of intelligence without others, an outcome that seems hard to understand in the bigger-and-better-brain model they propose. Third, where it is simply testable, the tests are not done: if carriers of the mutations associated Tay-Sachs, BRCA1 and the like are benefiting from having inherited bigger and better brains, then they should outstrip their non-carrier siblings in IQ tests. And finally, it argues that Ashkenazim are the product of unique circumstances and offers no strong evidence for a comparable example elsewhere, a serious flaw in any scientific hypothesis.

But let us say for the sake of argument that further work will show this paper to be correct, and that Ashkenazim as a population have higher IQs as part of their birthright. Is this good for the Jews? It is neither good nor bad. It is simply irrelevant; Judaism is not inherited through DNA. The paper reports that the Ashkenazic genetic differences from the rest of their North-European neighbors are not found in Sephardic and Yemeni families who make up the majority of the Jews of Israel. On the other hand, the DNA evidence reported here tells us that on average over the many generations of the last two millennia, about one in 200 ancestors of today's Ashkenazim were themselves the children of at least one non-Jewish parent. Forgetting that King David's ancestors included Ruth the Moabite, some may wish to think that Ashkenazim have no non-Jewish ancestors, but the evidence goes the other way.

Like every creator of the texts that make up the canon of today's Judaism — from Ezra the Scribe, through the redactors of the Mishnah, to the creators of the Babylonian and Jerusalem Talmuds, to certainly Rambam if not also Rashi — the majority of Israelis today would not have, nor need, the presumptive advantages of a supercharged Ashkenazi IQ. Nor is this a Jewish problem, because whether Ashkenazim inherited a cluster of genetic diseases through selection for high IQ or for any other reason, they still have and will continue to have the same Jewish obligation to teach their children from these texts, and to say the Sh'ma to remind themselves of this obligation, twice every day.

The moral context that gives meaning to science through medicine requires the attention of both science and medicine to a person in all his or her complexity and variability. The linkage of scientific medicine to religious history rather than to religious values may be more interesting in scientific terms, but it is fatally dangerous in medical terms.

“The use of DNA data to make claims of inherited religious sensibility is inherently wrong.”

Perhaps the best way to see the difference is to understand that though in social terms people tend to aggregate into groups of majority and minority populations—often separated by religion—by the data of our genomes we are all members of genetic minorities that range in size from the millions of a founder population, to the dozens of an immediate family, to the irreducible minority of one which is at the heart and soul of medicine. It would do us well to acknowledge that nothing in the legacy of human DNA blocks the choice to value the differences among us above the resemblance any of us might have to our idea of an ideal person.

By each of us exerting our free will to decide whether it is wise for us to know more or to know less about our own DNA at any given moment, the scientific data of DNA-based medicine may be returned to a proper medical context. In light of the DNA evidence we already have, this also means stretching the definition of normal variation to include the greatest possible diversity of inherited appearances and behaviors. Our obligation here is as clear in its own way, as is the countervailing trend in current medical science.¹⁵

“People—our species—are one family in precisely the same way that Jews are not.”

What of the future? Knowledge is not wisdom. King Solomon knew the difference, and when he had to choose between them, he picked wisdom over knowledge. Two prostitutes came to him with a difficult case. They had both given birth within the past three days and the mothers and newborns were alone together the night one infant died. Each claimed the remaining child was hers. 1 Kings, Chapter 3 describes Solomon's strategy for deciding between them:

The king said, "One says, "This is my son, the live one, and the dead one is yours"; and the other says, "No, the dead boy is yours, mine is the live one." So the king gave the order, "Fetch me a sword." A sword was brought before the king, and the king said, "Cut the live child in two, and give half to one and half to the other.

But the woman whose son was the live one pleaded with the king, for she was overcome with compassion for her son. "Please, my lord," she cried, "give her the live child, only don't kill it!" The other insisted, "It shall be neither yours nor mine; cut it in two!" The king spoke up. "Give the live child to her," he said, "and do not put it to death; she is its mother.""

Solomon had no way of knowing which woman was the biological mother, but he took the absence of such knowledge as an opportunity for wisdom, and gave the baby to the woman who displayed the most compassion for it. Now imagine that Solomon's court was in recent session, and the woman who called out for the child to be divided in two, who felt so strongly about losing it that she would rather see it dead than in the other's hands, said "Please, my lord, I appeal to you for a DNA test."

What would Solomon do if the test showed that she was, in fact, the mother of the live child? Would this knowledge lead him to change his decision, or would his wisdom still compel him to let it stand? The text makes it plain that Solomon's wisdom lay in deciding where the child's interests lay, and that its interests neither depended upon nor could be served by any manner of scientific evidence. What was wise for Solomon to do would be wise for us as well: we should demand that medicine and science place human needs ahead of other considerations, and be sensitive to the facts of life and death that unite us all.¹⁶

Holding on to the wisdom of Solomon in the age of DNA will not be easy. The live child did not need to know its mother's DNA; it needed to be cared for. Its life would not have been in any way improved by genomic knowledge. Many of us will face a dilemma like Solomon's in years to come. Each year molecular medicine tells more of us about the inherited conditions from which we will fall ill or even die, without being able to cure, prevent, or even ameliorate many of these same conditions. The German Pastor Dietrich Bonhoeffer gives us the map of the territory he died fighting against, the territory we are to avoid:

Nothing betrays the idolization of death more clearly than when an era claims to build for eternity, and yet life in that era is worth nothing, when big words are spoken about a new humanity, a new world, a new

¹⁵ Brosius, J., "From Eden to a Hell of Uniformity? Directed Evolution in Humans," 2003, *BioEssays* 25: 815.

¹⁶ Pollack, R., "Wisdom Versus Knowledge: An Agenda For a More Humane Medical Science," 1999. *FASEB Journal*, vol 13, p. 1477.

society that will be created, and all this newness consists only in the annihilation of existing life.¹⁷

Here are four concrete examples of how we may hope to act to prevent the re-emergence of the disasters of the past. Two concern our families and friends; the other two test our sense of being all part of one human family.

The first example arises from the power of DNA analysis to uncover ancient common ancestries, and it pertains to Israelis and their neighbors. From *Genesis* 25: 7-9:

This was the total span of Abraham's life: one hundred and seventy-five years. And Abraham breathed his last, dying at a good ripe age, old and contented; and he was gathered to his kin. His sons Isaac and Ishmael buried him in the cave of Machpelah...

It should not come as a surprise to learn—recall—that exiled Ishmael, circumcised patriarch of the twelve Arab tribes, rejoined his half-brother, the Jewish patriarch Isaac, to give their father a proper burial alongside Isaac's mother. If the tradition of descent from Isaac's son, Jacob, links Jews together despite the absence of biological confirmation for that ancestry, it must also link Jews forever with their Muslim cousins.

One day the Jews of Israel will have to ask whether there can be an Israeli Law of Return that makes sense while excluding the children of Ishmael. The only two countries that have a "law of the Return" are Israel and Germany. In both countries, and in no others, a person born outside the country may receive citizenship on request by virtue of religion or "blood," while other persons born inside the borders may not receive citizenship, for similar reasons.

It remains of course for Germans and Israelis to decide their own laws. Meanwhile, we can all ponder the second example, the fact that because

of recent German laws based not on bad biology but on the sincere wish to re-establish a Jewish community in Germany, more than a quarter of a million Jews, most from the Former Soviet Union, have formed many dozens of Jewish communities all across Germany. Indeed, more Jews have left the FSU in recent years to immigrate to Germany than to Israel.

"What stops our parts of the civilized world from intervening in Sudan, today?"

Very recently it appears that the government of Germany has decided to reverse its policy of subsidizing these new Jewish communities. It is hard for me to understand whether that is because it has succeeded, or because it has failed, in the eyes of the State. I can only point out that through my own eyes, the rebirth of dozens of Jewish communities in Germany, including of course in Berlin, is a wholly redemptive and hopeful sign, and one I believe Pastor Bonhoeffer would have welcomed.¹⁸

The third and fourth examples will test our capacity to act on behalf of weak and suffering strangers, who number in the first case hundreds of thousands, and in the second, hundreds of millions. From the website of the "Save Darfur coalition:"

A preventable humanitarian crisis, affecting more than two million people, is raging in the Darfur region of western Sudan. ... Government-backed militias, known collectively as the Janjaweed, are systematically eliminating entire communities of African tribal farmers. ... These acts were conducted on a widespread and systematic basis. ... The vast majority of the victims of all of these violations have been from the Fur, Zaghawa, Massalit, Jebel, Aranga and other so-called "African' tribes." The effects of this ethnic cleansing campaign have been devastating. It is estimated that at least

¹⁷ Bonhoeffer, D., *Works*, vol 6, "Ethics," translated 2004, Fortress Press, Minneapolis, "Ethics as Formation," page 91.

¹⁸ Bernstein, R., "Policy Shift in Germany Trims Jewish Migration." *New York Times*, February 20, 2005.

200,000 people have died. More than 1.6 million people have been displaced from their homes and over 200,000 have fled across the border to Chad. Many now live in camps lacking adequate food, shelter, sanitation, and health care. ...

Surely here is an example where we can say with confidence what Bonhoeffer would urge us, and the governments of our states, to do. What stops our parts of the civilized world from intervening in Sudan, today? Could it be a re-emergence of the racism that Bonhoeffer so clearly saw as the source of state-sponsored murder of innocents? I ask because in Sudan the government, the victims and their murderers are all Africans and many are Muslims, and so the crimes, the criminals and the victims would all be of small consequence to anyone for whom the toxic mixture of “race” and religion still has defining potency.

“Our ideology remains rooted in the false biology of race.”

The fourth example is also a matter of the death of innocent Africans. From *The New-York Times*, March 5, 2005:

As H.I.V., the AIDS virus, spreads further, Africa will face "an unprecedented crisis and a challenge never before seen since the advent of slavery," Dr. Peter Piot, the executive director of the Geneva-based United Nations AIDS program, said at a news conference in Addis Ababa, according to Reuters.

The United Nations said the report was intended to improve decision-making and deepen public understanding of the possible course of the AIDS epidemic in Africa by 2025, when "no one under the age of 50 in Africa will be able to remember a world without AIDS." By then, 89 million more people in Africa could be infected with H.I.V., under the worst circumstances, the United Nations said. An estimated 25.4 million people in Africa are infected now. "The death toll

will continue to rise, no matter what is done," the United Nations report said. "There is no single policy prescription that will change the outcome of the epidemic.' ... [The UN doctors' report] envisioned investments in health systems, agriculture, education, electrification, water and roads to change fundamentally the ways donors provide aid and recipient countries deal with the donations, to avoid inflation and not promote dependency. Such a situation would provide anti-retroviral drugs to 70 percent of people needing them by 2025.

That effort would be expected to halve the number of people living with H.I.V. and AIDS despite an anticipated growth in population of 50 percent. The cost would be \$200 billion, with the United States increasing its contribution to \$10 billion a year by 2014 and sustaining that amount until 2025, when it would begin to decrease.

The United States could make its payments without noticing the impact to its economy. Pro-rated, so could the European Union; for Germany, whose monuments of acknowledgement and memorial of the *Schoab* are so serious and complicated, a national willingness to pay for African medicine could be a special *Denkmal*, a new way of putting real force behind the idea of “Never Again,” before it is once again too late. Why then is this not happening? As Bonhoeffer said of an earlier example of non-intervention in the death of innocents, “The thesis ... has its roots not in fundamental social, economic or hygienic reasons, but in ideology [*Weltanschauung*].” And again, I fear that our ideology remains rooted in the false biology of race. “After all,” I imagine good people thinking in silence, “we must take care of our own people, and these are only Black Africans.” To that notion, we already have Bonhoeffer’s answer:

Christianity has adjusted itself much too easily to the worship of power. It should give much more offense, more shock to the world, than it is doing. Christianity should [...] take a much more definite

stand for the weak than to consider the potential moral right of the strong.¹⁹

Aldous Huxley's *Brave New World* casts long shadows. When Huxley revisited that book's terrain twenty years after it appeared—soon after the structure of DNA was discovered—he came to this conclusion:

An education for freedom (and for love and intelligence which are at once the conditions and the results of freedom) must be, among other things, an education in the proper uses of language....[This education should teach] the value, first of all, of individual freedom, based on the facts of human diversity and genetic uniqueness; the value of charity and

compassion, based on the old familiar fact, lately rediscovered by psychiatry, the fact that, whatever their mental and physical diversity, love is as necessary to human beings as food or shelter; and finally, the value of intelligence, without which love is impotent and freedom unattainable.²⁰

Perhaps the first task of the education that Huxley describes is to teach all of us this truth: that to be born mortal with a mind that can imagine perfection or immortality is a cruel joke of nature. My colleagues and I can outwit this devil of our imagination, not by serving it, but by understanding that despite their imperfections our children—the world's children—are the only immortality we are allowed, and we must work to preserve their futures while we can.

¹⁹ Bonhoeffer, D., "London 1933-1935," (1994). Chr. Kaiser Verlag, Berlin, p. 411. This is an excerpt of a talk Bonhoeffer gave in English on the BBC on December 9, 1934. It was an *Abend-Predikt* on "my strength is made perfect in weakness," II Corinthians 12,9.

²⁰ *Brave New World Revisited* (Harper Perennial 1965) p. 128.