The Search for Perfection: Understanding the Motives of Nazi Experimentation

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Scientific experimentation conducted by the Nazi regime during the middle of the 20th century has the stigma of being scientifically unsound, morally corrupt, and ethically inhumane. The use of unwilling prisoners—in experiments that often led to severe deformity or death—is understandably the driving force behind today's condemnation of the investigations carried out by the Nazi party. A detail that is often disregarded, however, is that Nazi research was not a departure from mainstream science. On the contrary, it was aligned with the international push for increasing knowledge of the human body in order to create a healthier, more vital population; American endorsement of German institutions in both the pre- and post-Nazi scientific communities exemplify this correlation. In context, it is apparent that the Nazis were not acting in opposition to prevailing scientific theories. Indeed, it was the international ambition to gain medical knowledge at any cost that produced an environment conducive to promoting the extreme human experimentation conducted by the Nazi scientists and physicians.

Medical Darwinism arose as a prevailing scientific theory between 1880 and1940. It combined medicine's focus on the human body with evolutionary biology's reliance on natural selection in an attempt to better understand both health and disease states, especially related to heredity,[1] Doctors did not yet understand the pathology behind hereditary diseases and were looking for ways to explain why certain ailments manifested in particular patients but not in others. At the time, medicine was based largely on the idea of individual "diatheses" or "constitutions," which were thought to make select subsections of populations more prone to

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[1] Fabio Zampieri, "Medicine, Evolution, and Natural Selection: An Historical Overview," *The Quarterly Review of Biology* 84, no. 4 (December 2009): 333-355.

specific diseases.[2] Later, the idea of "types" in people would replace diatheses as the determinants of hereditary disorders in the population.[3]

Evolutionary biologists employing the theory of natural selection were also important contributors to the Medical Darwinism dialogue. Charles Darwin's theory of natural selection emphasizes survival of the entire population over individuals, and underscores the necessity of cultivating a fit gene pool for the continued existence of a species.[4] This idea solidifies the connection between medicine and evolutionary biology. Better "types" could be maintained over generations as the fitter individuals survived to reproduce, creating the robust gene pools on which Medical Darwinism relied. On the other hand, unfavorable types—those that were viewed as being more vulnerable to hereditary diseases—needed to be eliminated for the benefit of the population. If the survival of a species, such as *homo sapiens*, could be correlated with these types, it follows that doctors and scientists alike would be interested in investigating how reproductive success could be achieved through manipulating member types within a gene pool. Investigators sought to understand what determined types, and wondered why individuals with certain types were affected by disease, while others were asymptomatic. The search for answers to these questions would allow Medical Darwinism to flourish through the middle of the 20th century.

Medical Darwinists continued to expand their theory between 1880 and 1940, which led to attempts at controlling the evolution of humans by applying the practice of eugenics. In 1883, Charles Darwin's cousin, Francis Galton, pioneered the field of eugenics, defining it as "science dealing with all the influences that improve inborn qualities of race and develop them to the

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[2] Fabio Zampieri, "Medicine, Evolution and Natural Selection," 335
[3] Fabio Zampieri, "Medicine, Evolution and Natural Selection," 335.
[4] Fabio Zampieri, "Medicine, Evolution and Natural Selection," 342.

utmost advantage,"[5] At the beginning of the 20th century, the push to strengthen the "Volk"—the collective race culture—was especially prominent in Germany,[6] Anything that could weaken the gene pool and endanger the survival of the Volk was deemed a threat to Germany and investigators sought to control such factors in order to preserve German culture. Biomedical investigators attempted to eliminate types that would increase individuals' risk of developing what were believed at the time to be hereditary diseases: alcoholism, schizophrenia, epilepsy, blindness, deafness, retardation, and criminality.[7] While modern scholars may see this notion as an extreme departure from Medical Darwinism, it was merely a slight extension of the theory. By this time, "types" had become synonymous with "race" in certain medical and scientific communities, thus justifying an investigation of a biological possibility of superior races. Experts sought to determine the "ideal" state of being to which "diseased" states could be compared. At this time, much of the conventional theory considered health and disease as two opposite states with no range existing between the two.[8] Experts used such comparisons to gain what they hoped would be a complete understanding of the diseases plaguing their populations of interest. The "Transparent Man" model—a see-through figure of a man—represented the goal of achieving full understanding of every aspect of the body and the exhibit was purchased by leading medical institutions including the Mayo Clinic and the Cleveland Health Museum.[9] This model was a testament to the ideas of eugenics, and the notion that vulnerability to disease was a product of human evolution. Both the German and American scientific communities operated

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[5] David, H.P., Fleischhacker, J., Hohn, C, "Abortion and Eugenics in Nazi Germany," *Population and Development Review* 14, no. 1 (March 1988): 81-112.
[6] Fabio Buzzard, "Medicine, Evolution, and Natural Selection," 344.
[7] David, H.P., Fleischhacker, J., Hohn, C, "Abortion and Eugenics in Nazi Germany," 89.
[8] Fabio Zampieri, "Medicine, Evolution and Natural Selection," 345.
[9] Bachrach, Susan, "Deadly Medicine," *The Public Historian* 29, no. 3 (Summer 2007): 19-32.

under the assumption that understanding how biological types were prone to such vulnerabilities would enable vast improvements in medicine.

The promise of biomedical progress prodded Germany to invest its scientific energy in investigating the application of eugenics theory to population survival in the early 1900s. At the turn of the century, Germany had significant reason to worry about their waning population. Between 1876 and 1880, the birth rate was 39.2 births per one thousand people; almost triple the rate documented in 1933, which was only 14.7 births per thousand people.[10] Reproductive experts feared that inferior genetic make-ups were preventing large segments of the population from surviving to reproductive age, thereby hindering healthy population growth rates. German scientists turned to eugenics in an attempt to eliminate inferior types—or races, as they were commonly referred to—thereby allowing a return to an evolutionarily fit - Volk - that would preserve German heritage and legacy for generations to come. Contrary to conventional knowledge, the study of eugenics was occurring worldwide before it became synonymous with Nazi policy. The American eugenics movement, which flourished between 1905 and 1935, was based largely on fears that inferior types were reproducing faster than superior ones, leading to a decline in population rates much like the one observed in Germany during the same time period.[11] In fact, the Rockefeller Foundation in New York helped fund German research into hereditary links to diseases such as tuberculosis, cancer, and "insanity" at the Kaiser Wilhelm Institute for Anthropology, Human Heredity, and Eugenics starting in 1927.[12] This close collaboration demonstrates the ways in which German eugenics research was both supported and informed by the American scientific community.

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10 David, H.P., Fleischhacker, J., Hohn, C, "Abortion and Eugenics in Nazi Germany," 87.
11 David, H.P., Fleischhacker, J., Hohn, C, "Abortion and Eugenics in Nazi Germany," 88.
12 Bachrach, Susan, "Deadly Medicine," 23.

Once the scientific basis of eugenics had been established and supported by other powerful nations such as the U.S., the Nazi party proceeded to apply the theory to the perceived deterioration of the national Volk. Mass sterilization was one of the first campaigns developed and put into effect in an attempt to eliminate the undesirable traits being passed on by the inferior races in society. According to the *Nuremberg Laws for the Protection of German Blood* created in 1935, the Jewish population was considered a race and was therefore subject to this type of eugenic control.[13] Mental afflictions, such as conscientious objection (considered a form of schizophrenia) also fell into this category. While the unethical nature of mass sterilization is undisputable from a modern perspective, these campaigns were aligned with a guideline that permeated science in the Nazi regime: theories were derived from observations, which in turn led to theory testing and the results were used to move the medical field forward.

Mass sterilization campaigns were just the beginning of the Nazi party's exploration of the applications of eugenics. Further research into the physical make-up of the human body was conducted to determine the link between degeneration and disease, in the hopes that researchers could better comprehend the influence of both heredity and the environment on evolution. These ideas drew the attention of many internationally renowned scientists, most of whom had nothing invested in the experiments besides a concern with the potential implications for science and medicine. With the advancement of these fields as the driving force, the Nazi party began conducting studies on physiology and environmental conditions. Ethical backlash did not

[13] Seidelman, William E, "Megnele Medicus: Medicine's Nazi Heritage," *The Milbank Quarterly* 66, no. 2 (1988): 221-239.

denounce Nazi experimentation as unconscionable until well after U.S. military officials deemed some of the results relevant, especially in military domains.[14]

One field of particular interest to Nazi scientists was physiology. These experiments involved placing various stresses upon the body in order to observe the reactions among the different systems. In many cases, the information gathered during this type of research was intended to develop military strategies and to inform other industries that employed large portions of the population. Examples of physiological research conducted by the Nazi scientists include the Dachau seawater experiments that used prisoners as subjects. Prisoners were given seawater and a chemical called Berkatit to ascertain the period of time for which this diet would sustain life. German researchers conducted this particular investigation to determine if Berkatit should be added to the ships' emergency kits to aid in the survival of shipwrecked sailors.[15] The use of human subjects against their will is rightfully deemed one of the most unethical aspects of the Nazi experiments. While the use of unwilling prisoners is disreputable, this study exemplifies the Nazis' intent to gain medically relevant knowledge from which Germans could benefit, not just the attempt to cause harm to those in the concentration camps.

Another physiological experiment took place in the Warsaw Ghetto during 1947.[16] However, the uniqueness inherent in this study stemmed not from the subjects or the hypothesis, but from the identity of the researchers, whom were Jewish doctors living in the Nazi-occupied ghetto. The doctors recognized that the horrific conditions in the ghetto provided an opportunity for "addition to the scientific knowledge of the effect of starvation on the human body"[17] and

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[14] Boozer, Jack S, "Children of Hippocrates: Doctors in Nazi Germany," *Annals of the American Academy of Political and Social Science* 450, Reflections on the Holocaust: Historical, Philosophical, and Educational Dimensions (July 1980): 83-97.
[15] Boozer, Jack S, "Children of Hippocrates," 92.
[16] Starvation Study Made," *The Science News-Letter* 56, no. 1 (July 1949): 7.
[17] "Starvation Study Made", 7.

thus began keeping track of the physical and mental effects of the eight hundred calorie per day diet imposed by the occupying forces. They noted the deterioration of their community members, as children especially became sluggish and apathetic as the weeks progressed. The results of the experiment were smuggled out of the ghetto and later published in a 1949 edition of *The Science News-Letter*, which cited the goal of the study as "improving the knowledge of the pathology of hunger and how the body uses energy when caloric intake is greatly restricted."[18] While the Jewish doctors did not choose to put their research subjects in such terrible conditions—as opposed to the way in which the Nazi party procured their subjects by imprisonment—their basic motivation for conducting the study was to gain scientific knowledge in the hopes that the subjects' suffering would one day impact humanity in a positive manner. The similarities between the motivation and purposes behind this starvation study and the seawater experiments are undeniable. Scientific advancement for the betterment of the population is at the root of both inquiries, placing both studies in line with the mainstream practices during this time period.

A final example of experimentation during the Nazi regime comes from the famous hypothermia experiments conducted at Dachau by Sigmund Rascher, a Nazi medical officer. These experiments took three hundred male prisoners and immersed them in ice water baths until they lost consciousness and then revived them, only to immerse them again later.[19] The rate at which the bodies cooled in the baths was recorded and analyzed to discern the effects of this environmental trauma on the body. Cold experiments were an area of interest for the Nazi party due mainly to the potential application of the information obtained; these unprecedented data sets allowed high-ranking military doctors and strategists to discern how the human body reacted to the harsh conditions typically faced by soldiers during war. Knowledge of this sort was so

[18] "Starvation Study Made," 7.
[19] Berger, Robert L, "Ethics in Scientific Communication: Study of a Problem Case," *Journal of Medical Ethics* 20, no. 4 (December 1994): 207-211.

revolutionary that U.S. military officials released a report of Rascher's findings, which promoted the use of the data in future research and medical literature.

U.S. Army neuropsychiatrist Leo Alexander analyzed the Dachau hypothermia experiments in a report entitled "The Treatment of Shock from Prolonged Exposure to Cold, Especially in Water," which was released by the Army and Navy Office of the Publication Board. Alexander initially endorsed the studies and concluded that the results satisfied "all criteria of objection and accurate observation and interpretation."[20] Based on Alexander's findings, the Publication Board released the report to the general public, citing the direct benefit to American science and industry that the report entailed. Despite a later retraction, the consequences of the American endorsement were extensive. Most importantly, it venerated the Nazi scientists and their method of procuring research subjects, while demeaning the suffering experienced by the individuals. Additionally, it would provide justification for the citation of the data in the post-World War II scientific literature. Leo Alexander's report exemplifies how the existing scientific environment—which sought medical understanding of the human body above all else—created ideal conditions for the type of unscrupulous human experimentation that has become synonymous with Nazi medicine.

Utilization of hypothermia data was not a rare occurrence throughout the research world in the years following the publication of the Alexander's report. Few alternatives to this unique data set existed and experiments of this kind would likely never be repeated. John Hayward of the University of British Columbia, for example, has used the body cooling curves derived from the hypothermia data to extrapolate how long suits used on fishing boats could protect capsized

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20 Moe, Kristine, "Should the Nazi Research Data Be Cited?" *The Hastings Center Report* 14, no. 6 (December 1984): 5-7.

fishermen in the freezing Canadian waters.[21] Hayward observed consistency between these cooling curves and others produced by experiments in warm water, which supports the validity of the original curves, according to the professor.[22] When questioned about the ethics behind using data attained through human suffering, Hayward responded,

> *"I don't want to have to use this data, but there is no other and will be no other in an ethical world. Not to use it would be equally bad. I'm trying to make something constructive out of it."*[23]

In fact, using the exploitative Nazi data collection methods to benefit a larger population appears to be a modern invocation of Medical Darwinism and the international eugenics movement that laid the original groundwork for Nazi scientific investigation.

In addition to using the Nazi data in research projects, many authors have cited the statistics in scientific literature. Since World War II 45 articles citing Nazi data have been published worldwide.[24] The acceptance of such articles in respected journals, such as the *Journal of the American Medical Association*, legitimizes both the methodology as well as the results of the Nazi experiments, eliciting consideration of an important question: can unethically obtained data be ethically applied to science today?

While the experimental methods, results, and subsequent use of Nazi research will continue to be disputed, positive outcomes of the experiments have been identified. First, the data sparked dialogue on ethics in human experimentation, a topic to which researchers paid little attention prior to the publication of the Alexander Report. This discussion led to the

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[21] Moe, Kristine, "Should the Nazi Research Data Be Cited?" 5.
[22] Moe, Kristine, "Should the Nazi Research Data Be Cited?" 5.
[23] Moe, Kristine, "Should the Nazi Research Data Be Cited?" 5.
[24] Post, Stephen G, "The Echo of Nuremberg: Nazi Data and Ethics," *Journal of Medical Ethics* 17, no. 1 (March 1991): 42-44.

creation of the Nuremberg Code that currently regulates U.S. research.[25] Additionally, allocation of research funding increased substantially after World War II, which catalyzed sizeable gains in scientific knowledge. Advances made due to a massive 624-fold increase in the National Institute of Health's research budget surely improved the quality of life for scores of people around the U.S. and likely extended to the rest of the world as well.[26] The increased funding in America underscored the idea that progress necessitates the use of human subjects, albeit under more ethical conditions than the Nazis employed. While this funding made new developments in medicine possible, it is surprising that ethically condemned data bolstered clinical research so soon after the atrocities were publicized. Putting scientific gains above the lives of individuals led to the reckless application of scientific theories such as eugenics and Medical Darwinism in the political atmosphere of the mid-20th century. Encouraging the same progress through increasing funds treads the thin line that separates solid scientific pursuits from the extreme applications that caused much human suffering under the Nazi regime.

The scientific investigations conducted by Nazi scientists tend to serve as an outlet for the modern day backlash against the human suffering of the Holocaust and World War II. However, it is necessary to contextualize the experimentation within the time period that preceded the Nazis' ascent to power in Europe and in terms of the environment out of which the research developed. This requires modern critics to acknowledge the preexisting theories of Medical Darwinism and eugenics that prevailed throughout the international scientific community, specifically in the United States, between 1880 and 1940. It is undeniable that researchers employed unethical methods, especially during the seawater and hypothermia experiments conducted at the Dachau concentration camp, but their approach did not develop unexpectedly.

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[25] Boozer, Jack S, "Children of Hippocrates," 95.
[26] Beecher, Henry K, "Ethics and Clinical Research," *Bulletin of the World Health Organization* 79, no. 4 (April 2001): 367.

The obsession with gaining scientific and medical knowledge was an international phenomenon that the Nazi party exploited by conducting experiments on imprisoned human subjects. It is necessary for contemporary researchers to understand the atmosphere out of which these experiments evolved; doing so allows modern science to commemorate the tragic realities faced by the individuals who suffered for the sake of science under the Nazi regime.

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