

DYSGENICS

Genetic Deterioration in Modern Populations.

Second Revised Edition

Richard Lynn

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Chapter 1

Historical Understanding of the Problem

1. Benedict Morel Identifies Genetic Deterioration. 2. Francis Galton Formulates the Concept of Eugenics. 3. Gloomy Views of Charles Darwin. 4. Herbert Spencer and Social Darwinism. 5. Karl Pearson Restates the Problem. 6. The Rise of Eugenics. 7. Ronald Fisher on the Decay of Civilizations. 8. Julian Huxley and the Evolutionary Perspective. 9. Hermann Muller's Geneticists' Manifesto. 10. Raymond Cattell and the Decline of Intelligence in England. 11. The 1963 Ciba Conference. 12. The Decline and Fall of Eugenics. 13. Conclusions.

In the middle decades of the nineteenth century a number of biological and social scientists believed that the genetic quality of the populations of the Western nations was deteriorating. They thought that this was occurring because of the relaxation of natural selection, the process by which nature in each generation eliminates the unfit by reducing their fertility and by early death. Once natural selection becomes relaxed, or even ceases to operate at all, they believed, genetic deterioration would inevitably take place. They thought that this process had already begun.

Once this conclusion had been reached, some of these Victorians began to think about what could be done to counteract genetic deterioration. The person who gave most thought to this was a young cousin of Charles Darwin named Francis Galton. His solution was that natural selection should be replaced by consciously designed selection, through which human societies would control and improve their own genetic quality. For this consciously designed selection Galton (1883) proposed the term *eugenics*. In 1915 the term *dysgenics* was coined by Caleb Saleeby for the genetic deterioration that eugenics was designed to correct.

The view that the populations of Western nations were deteriorating genetically and that steps needed to be taken to correct this came to be widely accepted in the first half of the twentieth century. In the second half of the century a reaction against eugenics set in, and from the 1970s onward eugenics became virtually universally dismissed. My objective in this book is to make the case that in the repudiation of eugenics an important truth has been lost, and to rehabilitate the argument that genetic deterioration is occurring in Western populations and in most of the developing world. This opening chapter sets out the development of this idea and its subsequent rejection.

1. Benedict Morel Identifies Genetic Deterioration

The first full analysis of the adverse effect of the slackening of natural selection on the genetic quality of the population was made in the 1850s by a French physician named Benedict Augustin Morel (1857). Morel perceived that infant and child mortality were declining in mid- nineteenth-century France, largely as a result of improvements in public health, and consequently that many infants and children who previously would have died were now surviving to adulthood. He argued that the increased survival rate and reproduction of the less fit must entail a deterioration of population quality. He identified the characteristics for which this was taking place as “physique” (health), “intellectuelle” (intelligence) and “morale” (moral character). Morel believed that these characteristics were transmitted in families from parents to children, through both genetic and environmental processes. He believed also that there was a degenerate class of criminals, prostitutes and paupers, a segment of society that was later to become known as the underclass, and that these groups had higher fertility than the rest of the population. He saw this as part of the problem of genetic deterioration.

Morel is little remembered today. There is no mention of him in the histories of the eugenics movement by Haller (1963), Ludmerer

(1972), Kevles (1985) and Degler (1991), or in the texts on eugenics by Osborn (1940), Bajema (1976) and Cattell (1972, 1987). But, working on the basis of what was inevitably the limited evidence of the 1850s, Morel was the first to set out the essential components of the case that genetic deterioration is taking place.

2. Francis Galton Formulates the Concept of Eugenics

Morel's work does not seem to have been read by his contemporaries in England, but someone who was thinking along similar lines was Francis Galton. Galton read Darwin's *The Origin of Species* when it appeared in 1859, and he realized that the process of natural selection, by which the genetic quality of the population is maintained, had begun to weaken in the economically developed nations of the time. He first aired this problem in 1865, when he wrote that "One of the effects of civilisation is to diminish the rigour of the application of the law of natural selection. It preserves weakly lives that would have perished in barbarous lands". He went on to note that natural selection had weakened not only against poor health but also against low intelligence and what he called "character" (Galton, 1865, p. 325), the same three qualities that Morel had independently identified in France. By "character" Galton meant a strong moral sense, self-discipline and good work motivation. In contemporary psychology this broad trait has become known as *conscientiousness* and we shall be examining it in detail in Chapters 12 through 14. Until then I shall stick with Galton's term *character*.

Galton returned to the theme of genetic deterioration at greater length in his book *Hereditary Genius* (1869). Here he suggested that in the early stages of civilization what he called "the more able and enterprising men" were the most likely to have children, but in older civilizations, like that of Britain, various factors operated to reduce the number of children of these and to increase the number of children of the less able and enterprising. He thought that the most important of these factors was that able and enterprising young men tended not to marry, or only to marry late in life, because marriage

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and children would impede their careers. The effect of this was that “there is a steady check in an old civilisation upon the fertility of the abler classes: the improvident and unambitious are those who chiefly keep up the breed. So the race gradually deteriorates, becoming in each successive generation less fit for a high civilisation”(Galton, 1869, p. 414).

Galton thought that the genetic deterioration of Western populations was a serious problem and that steps needed to be taken to counteract it. In principle, he thought that this was straightforward. It would consist of replacing natural selection by consciously designed selection. This would be carried out by adopting the methods that had been used for centuries by animal and plant breeders and consisted of breeding from the best varieties to obtain improved strains. Galton proposed that the same method would work and should be applied in practice to humans.

Galton first advanced this idea in his 1865 article, and he elaborated on it in *Hereditary Genius*. Here he wrote, “As it is easy to obtain by careful selection a permanent breed of dogs or horses gifted with peculiar powers of running, or of doing anything else, so it would be quite practicable to produce a highly gifted race of men by judicious marriages during several consecutive generations” (Galton, 1869, p. 45). Galton researched the pedigrees of eminent men, such as lawyers, scientists and statesmen, and showed that outstanding ability and talent were frequently transmitted from generation to generation in elite families. He proposed that this was due to the genetic transmission of high ability and the character qualities of work commitment, energy and ambition. He argued that this showed it would be possible to improve the genetic quality of human populations by increasing the fertility of the talented individuals.

Galton developed this idea further in his next book, *English Men of Science*. In this he traced in greater detail the family pedigrees of a number of eminent English scientists. He found that most of them came from the professional and middle classes and concluded that these are “by far the most productive of natural ability”, although he

recognized that by the process of social mobility they are “continually recruited from below,” particularly from the families of skilled artisans. By contrast, he described the lowest classes as “the residuum” who are largely devoid of the qualities of intelligence and energy necessary for high achievement (1874, pp. 9-16).

Galton continued to work on the idea that the relaxation of natural selection was causing genetic deterioration and that this could be counteracted by consciously designed selection. In 1883 he coined the word *eugenics* for the study of this set of problems. The word was constructed from the Greek to mean “good breeding”. During the next three decades, Galton restated and elaborated this theme (Galton, 1883, 1901, 1908, 1909). In his autobiographical *Memoirs*, written shortly before his death in 1911, he reiterated that natural selection had broken down and that to avoid genetic deterioration it would be necessary “to replace natural selection by other processes” (1908, p. 323). He continued to affirm his view that a major part of the problem lay in the low fertility of the professional classes because “the brains of the nation lie in the higher of our classes” and that these people were having insufficient children in accordance with the general principle that “it seems to be a tendency of high civilisation to check fertility in the upper classes” (1909, pp 11, 39).

The basic elements of Galton's ideas were that there was a social-class gradient for ability and desirable character qualities of work motivation and social commitment, such that these were strongest in the professional classes and declined with falling socio-economic status. There was also an inverse relationship between social class and fertility such that the professional class had the lowest fertility. He believed that this was leading to genetic deterioration, but that this could be corrected by measures designed to reverse the negative relationship between social class and fertility. These ideas were the essential components of eugenics.

3. Gloomy Views of Charles Darwin

One of those who read Galton's *Hereditary Genius* shortly after it was published in 1869 was Charles Darwin, and two years later Darwin discussed the problem of the relaxation of natural selection in his second major book, *The Descent of Man* (1871). Here he noted that as human societies became more civilized, they showed increasing sympathy and compassion for their weaker members. He accepted that this was ethically right but pointed out that it involved a genetic cost because it entailed the survival and reproduction of those who previously would have died or not had children. Darwin summarized the problem in these words: "We civilised men do our utmost to check the process of elimination; we build asylums for the imbecile, the maimed and the sick; we institute poor laws; and our medical men exert their utmost skills to save the life of everyone to the last moment. Thus the weak members of civilised societies propagate their kind. No-one will doubt that this must be highly injurious to the race of man" (Darwin, 1871, p.501).

Darwin understood that the way to prevent genetic deterioration lay in curtailing the fertility of those with socially undesirable characteristics, writing that "Both sexes ought to refrain from marriage if they are in any marked degree infirm in body or in mind" (1871, p. 918). In those days if people refrained from marriage they also, for the most part, did not have children.

A few years later Darwin talked about these problems with the biologist Alfred Russell Wallace, who had formulated the theory of evolution independently of Darwin in the 1850s, and who recorded their discussion: "In one of my last conversations with Darwin he expressed himself very gloomily on the future of humanity, on the ground that in our modern civilisation natural selection had no play and the fittest did not survive.... It is notorious that our population is more largely renewed in each generation from the lower than from the middle and upper classes" (Wallace, 1890, p. 93). Wallace went on to record that Darwin spoke of the large number of children of

“the scum,” and of the grave danger this entailed for the future of civilization (Wallace, 1890, p. 93). Darwin understood that the relaxation of natural selection was leading to genetic deterioration.

4. Herbert Spencer and Social Darwinism

Another of those who in the 1870s understood the problem of genetic deterioration was Herbert Spencer. It was Spencer who coined the phrase “the survival of the fittest” which Darwin accepted as a useful shorthand term for the processes of natural selection by which genetically sounder or “fitter” individuals tend to survive and reproduce more than the genetically unsound or less fit. Spencer agreed with Gallon and Darwin that the principle of the survival of the fittest was ceasing to operate in civilized societies, and he wrote robustly of the undesirability of this trend: “To aid the bad in multiplying is, in effect, the same as maliciously providing for our descendants a multitude of enemies. Institutions which 'foster good-for-nothings' commit an unquestionable injury because they put a stop to that natural process of elimination by which society continually purifies itself” (Spencer, 1874, p. 286).

Spencer also coined the term Social Darwinism for the theory that the competition between individuals for survival and reproduction, which is present throughout animal and plant species, also exists in contemporary civilizations in the form of competition for social position. He held that individuals with intelligence and the character traits of a capacity for hard work and self discipline rose in the social hierarchy and formed a genetically elite professional and upper class, while those lacking in these qualities fell into the lower classes. He arrived at the same conclusion as Galton and Darwin that the low birth rate of the professional and upper class entailed a deterioration of the genetic quality of the population.

5. Karl Pearson Restates the Problem

In the next generation Karl Pearson (1857-1936) was the leading exponent of the theory of genetic deterioration. Pearson studied mathematics at Cambridge, became professor of mathematics at University College, London, and, in 1911, became the first holder of the Galton Professorship of Eugenics, a post founded by a bequest in Galton's will. Pearson's first important contribution was to clarify the problem of regression to the mean. Galton had demonstrated by experiments on peas that long pods produce offspring a little shorter than themselves, while short pods produce pods a little longer. It was realized that this is a general phenomenon of nature and holds for a number of human characteristics including ability. This had also been shown by Galton in his pedigree studies, where he found that the sons of eminent men were not on average as eminent as their fathers. The problem was that if regression to the mean continued to operate over several generations, the descendants of the highly intelligent and of the very dull would regress to the mean of the population. If this was so, it would not matter that the more talented classes had lower fertility than the untalented, since in a few generations their descendants would be indistinguishable from one another. In response to this problem, Pearson (1903) worked out a statistical theory which showed that selective breeding altered the population mean, and it was to the new mean that offspring would regress. This meant that the inverse association between ability and fertility was shifting the population mean of ability downward, and the genetic deterioration entailed by this would not be corrected by regression effects.

Pearson turned his attention next to the issue of the heritability of intelligence. The problem here was that genetic deterioration resulting from the inverse association between ability and fertility would only take place if intelligence has some heritability. Galton appreciated this and set out arguments for a high heritability of intelligence based on pedigree studies showing the transmission of

high ability in families, but Pearson realized that the case needed strengthening. He tackled this problem by making a study of the correlation between pairs of siblings for intelligence and for the physical characteristics of height, forearm length and hair and eye color. Data were collected from London schoolchildren for approximately four thousand pairs of siblings; their physical characteristics were measured and their intelligence assessed by teachers' ratings (Pearson, 1903).

To examine the strength of association for these characteristics 'between the sibling pairs, Pearson worked out the mathematics of the correlation coefficient. He found that all the characteristics were correlated among siblings at a magnitude of approximately 0.5. Numerous subsequent studies using intelligence tests have confirmed this result, the average correlation based on 26,000 pairs being calculated by Bouchard (1993, p. 54) at 0.47. Pearson's argument was that physical characteristics which are obviously under genetic control, like hair and eye color, and stature and forearm length among siblings, are correlated at a magnitude of about 0.5. This is also the case with intelligence and suggests that intelligence is likewise under genetic control. More generally, an environmental theory of the determination of intelligence would predict much more similarity between siblings than is actually present, because siblings are raised in closely similar environments and would be expected to have closely similar levels of intelligence. The relatively low correlation between siblings shows that genetic factors must be operating to differentiate them.

Pearson followed Galton, Darwin and Spencer in believing that natural selection had largely ceased to operate in modern populations as a result of the increased survival and high fertility of the less fit. In his 1901 book, *National Life*, he wrote that "while modern social conditions are removing the crude physical checks which the unrestrained struggle for existence places on the over-fertility of the unfit, they may at the same time be leading to a lessened relative fertility in those physically and mentally fitter stocks, from which the bulk of our leaders in all fields of activity have hitherto been drawn"

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(p. 101). Eleven years later he reaffirmed that "the less fit were the more fertile" and consequently "the process of deterioration is in progress" (1912, p. 32). Pearson drew the same conclusion as Galton that the only way to counteract genetic deterioration was by eugenic intervention. "The only remedy," he wrote, "if one be possible at all, is to alter the relative fertility of the good and the bad stocks in the community" (1903, p. 233).

6. The Rise of Eugenics

In the early decades of the twentieth century increasing numbers of biological and social scientists accepted the thesis that natural selection against the less fit had largely ceased to operate in modern populations, that those with high intelligence and strong character had begun to have lower than average fertility and that this must cause a genetic deterioration of the population. From this set of premises, many people were drawn irresistibly to the logic of Francis Galton that the only way to avert genetic deterioration was by finding consciously designed measures to replace what had formerly been done by natural selection. Those who were concerned with this question founded eugenics societies whose general purpose was to carry out research on the issues of heritability and genetic deterioration, to inform public opinion of the seriousness of the problem and to formulate policy proposals to counteract deterioration and replace it by improvement. In 1906 the American Breeders' Association, renamed the American Genetics Association in 1913, set up a Committee on Eugenics to promote the work on the concept, and in 1910 the Eugenics Record Office was established at Cold Spring Harbor on Long Island as a center for eugenic research and publication. The American Eugenics Society was formed in 1923. Eugenics societies were established in Germany in 1906 and in Britain in 1907, and by 1930 eugenics societies had been set up in many other countries, including Latin America, Australia, Canada, Japan and virtually the whole of Continental Europe.

Most of the leading biological and social scientists in the first half of the twentieth century were members of these societies and subscribed to their objectives. In Britain they included the biologists and geneticists Sir Ronald Fisher, Sir Julian Huxley and J.B.S. Haldane and the psychologists Sir Cyril Burt, Sir Godfrey Thomson and Raymond Cattell, who did most of the early work on the question of whether intelligence is declining. In the United States they included the geneticists Hermann Muller and Charles Davenport, who discovered that Huntington's Chorea is inherited by a single dominant gene, and the psychologists Robert Yerkes, who constructed the Army Alpha and Beta intelligence tests, and Lewis Terman, who set up the study of approximately 1,500 highly intelligent children who have been followed up over their life span. Although there were some dissenters, in the first half of the twentieth century, many of the leading biologists and social scientists accepted that modern populations were undergoing genetic deterioration and that eugenic measures needed to be found to correct this.

7. Ronald Fisher on the Decay of Civilizations

Among geneticists and biologists of the middle decades of the twentieth century who believed that natural selection had broken down, that genetic deterioration was taking place and that eugenic measures needed to be designed to counteract this, the foremost were Ronald Fisher, Julian Huxley and Hermann Muller. Ronald Fisher (1890-1962) was both a geneticist and a statistician. He graduated in mathematics at Cambridge and worked initially at the Rothamsted Experimental Station for genetic research. There he developed the mathematics of the statistical method of analysis of variance and, as his biographers say, “recast the whole theoretical basis of mathematical statistics and developed the modern techniques of the design and analysis of experiments” (Yates and Mather, 1963, p. 92). In 1933 Fisher was appointed as Karl Pearson's successor to the Galton Professorship of Eugenics at University College, London, and

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in 1943 he became professor of genetics at Cambridge where he remained until his retirement.

Fisher was twenty-eight when he published his first important paper on genetics integrating Mendelian single gene and polygenetic (multiple gene) processes (Fisher, 1918). Up to this time the dominant paradigm in genetics was Mendel's theory of the action of single genes, the effect of which was to produce two types of individuals. It was obvious that for many traits, such as height, skin color, intelligence and so on, there are not only two types, but a continuous gradation. Fisher demonstrated mathematically that traits of this kind could be explained by the joint action of a number of genes acting according to Mendelian principles, each of which contributed equally and additively to the determination of the trait. He showed that this would lead to correlations of about .5 between parents and children and between pairs of siblings; that it was possible to partition the variance of the trait into heritable and environmentally determined fractions; that the heritable fraction could be divided into that caused by additive genes, by dominance and genetic interaction; and that the correlation between siblings was further affected by "assortive mating," the tendency of people to mate with those like themselves, which raises the correlation between their children. This path-breaking paper laid the foundations of what was to become the science of biometrical genetics.

Fisher took up the issues of the breakdown of natural selection and genetic deterioration in his 1929 book *The Genetical Theory of Natural Selection*. In this he summarized a number of the early investigations showing an inverse association between socio-economic status and fertility. For instance, Heron (1906) had shown that among London boroughs the birth rate was inversely associated with an index of average socio-economic status. The 1911 census for England was analyzed by Stevenson (1920), who estimated that the fertility of the social classes was lowest among the professional and upper class, who had an average of 1.68 children, and increased progressively among the lower middle class (2.05), skilled workers (2.32), semiskilled (2.37) and unskilled (2.68). The census of 1906 in

France showed a similar trend with the average number of children of the middle class being 3.00 and of the working class, 4.04.

Fisher followed Galton in believing that social mobility over the course of centuries had led to the disproportionate concentration of the genes for high intelligence and strong work motivation in the professional class, and that, as a consequence, the low fertility of the professional class must entail genetic deterioration of the population in respect of these qualities. Fisher also followed and elaborated on Galton in his explanation for the inverse relationship between socio-economic status and fertility: This was that intelligent and well-motivated young men rise in the social hierarchy and tend to marry heiresses as a way of consolidating their social position. Heiresses tend to come from relatively infertile stocks, because if the stocks had high fertility these women would have had brothers and would not be heiresses. The effect of this was that able men tended to marry infertile women, and so had few children. He cited data in support of his contention that fertility does have some heritability. Fisher proposed that this process has frequently occurred in the history of civilizations and explained their decay, and he instanced classical Greece, Rome and Islam as examples. He proposed a universal sociological law asserting that advanced civilizations are characterized by dysgenic fertility, and that this leads to genetic deterioration and ultimately to the decay of civilization.

The Galton-Fisher theory of the causes of dysgenic fertility is rather implausible for several reasons. First, it is doubtful whether such an important fitness characteristic as fertility has any significant heritability because individuals who carried the genes for low fertility would have left fewer descendants, and these genes would have been eliminated. Second, even if fertility does have some heritability, it is questionable whether many able young men are sufficiently calculating to seek out and marry heiresses. Both Galton and Fisher forgot about the power of love in the selection of marriage partners. Fisher certainly did not follow his own theory because he married a fertile non-heiress by whom he had eight children. Third, there is no strong evidence to support the thesis that the decay of past

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civilizations has been due to dysgenic fertility. Fourth, the inverse association between socio-economic status and fertility in modern populations is most plausibly explained by the efficient use of contraception by the professional and middle classes and the increasingly less efficient use of it by the working classes. There is a class gradient for intelligence and the personality qualities of restraint, farsightedness and the capacity to "delay gratification," as we shall see in detail in Chapters 11, 12 and 14, and it is the social gradient of these qualities that is the principal cause of dysgenic fertility.

In spite of these criticisms of the Galton-Fisher theory of the causes of dysgenic fertility, we should not lose sight of the main point that Fisher believed there is a genetically based social-class gradient for intelligence and socially valuable personality traits, and hence that the inverse association between socio-economic status and fertility entails genetic deterioration. Fisher saw this biological success of the social failures as the greatest threat to the future of our civilization.

8. Julian Huxley and the Evolutionary Perspective

Julian Huxley (1887-1975) was the grandson of T.H. Huxley, the Victorian biologist who was known as Darwin's bulldog because of his rigorous defense of the theory of evolution, and the brother of Aldous Huxley who described a eugenic state in his novel *Brave New World*. Huxley studied biology at Oxford and went on to become chairman of the genetics department at the Rice Institute in Texas; professor of physiology at King's College, London; secretary to the London Zoological Society and, in 1946, the first Director General of UNESCO (The United Nations Educational, Scientific, and Cultural Organization). Huxley was primarily an evolutionary biologist whose major work was the integration in his book *Evolution, the Modern Synthesis* (1942) of Darwinian theory with Mendelian genetics.

Huxley was president of the British Eugenics Society from 1959 to 1962. He set out his views on eugenics in two lectures delivered to the society, the first in 1936 and the second in 1962. In the first he restated the argument that genetic deterioration is taking place in modern populations as a result of the relaxation of natural selection and of the inverse relationship between social class and fertility: “Deleterious mutations far outnumber useful ones. There is an inherent tendency for the hereditary constitution to degrade itself. But in wild animals and plants, this tendency is either reversed or at least held in check by the operation of natural selection, and in domestic animals and plants, the same result is achieved by our artificial selection. But in civilised human communities of our present type, the elimination of defect by natural selection is largely (though of course by no means wholly) rendered inoperative by medicine, charity, and the social services; while, as we have seen, there is no selection encouraging favourable variations. The net result is that many deleterious mutations can and do survive, and the tendency to degradation of the gene-plasm can manifest itself. Today, thanks to the last fifteen years' work in pure science, we can be sure of this alarming fact, whereas previously it was only a vague surmise. Humanity will gradually destroy itself from within, will decay in its very core and essence, if this slow but insidious relentless process is not checked. Here again, dealing with defectives in the present system can be at best a palliative. We must be able to pick out the genetically inferior stocks with more certainty, and we must set in motion counter-forces making for faster reproduction of superior stocks, if we are to reverse or even arrest the trend” (1936, p. 30).

Huxley believed that the two major causes of genetic deterioration in modern populations were the growth of social welfare, which was undermining the operation of natural selection in eliminating defective stocks by high mortality, and the development of the inverse relation between socio-economic status and fertility. Like Galton, Pearson and Fisher, he believed that the professional class is a genetic elite with regard to intelligence, and its low fertility must

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inevitably lead to genetic decline. In his 1962 lecture Huxley reasserted and elaborated on these points. He argued that those with genetic defects and what had come to be known as “the social problem group” should be discouraged from having children. He suggested that this could be achieved by voluntary sterilization and instruction and assistance in the efficient use of birth control.

9. Hermann Muller's Geneticists' Manifesto

Hermann Muller (1891-1967) recorded that he first became interested in eugenics at the age of ten when his father took him to the New York Museum of Natural History and explained the display of the evolution of horses' hooves. If horses' hooves could be improved by unplanned natural selection, the precocious child wondered, could not human beings also be improved by planned selection. Muller studied biology and genetics at Columbia University. In his first year he presented a paper on eugenics at a meeting of one of the college societies. In this he noted the relaxation of natural selection in contemporary societies, that this would result in a failure to eliminate detrimental mutations and that these mutants would accumulate, causing an increase in what he called the “genetic load”.

Muller spent the early years of his career as a research geneticist working on *Drosophila*, in particular on the effects of radiation in increasing mutations. He was in his mid-forties when he published his first major work on eugenics, *Out of the Night* (1935). In this he restated the mainline eugenic thesis that modern populations were deteriorating in regard to health, intelligence and character because of the reduction of mortality and dysgenic fertility: “The more shiftless, the less intelligent and the less progressive members of our communities are reproducing at a higher rate than those of a more desirable type”. Muller was the first advocate of the establishment of elite sperm banks as a possible way of reversing genetic deterioration. His idea was that “the greatest living men of mind, body, or spirit” would deposit sperm in these banks, and that many

ordinary women should be encouraged to make use of this by artificial insemination to produce children of high genetic quality. The donors would be men of sound health, high intelligence and also of co-operative and altruistic character.

In 1939 Muller attended the International Congress of Genetics in Edinburgh and while he was there drew up a document called "The Geneticists' Manifesto." This addressed the question, *How could the world's population be improved most effectively genetically?* The answers given to this question were, first, that the environment needed to be improved and made more egalitarian to allow those classes who were handicapped by impoverished social conditions to realize their full genetic potential. Second, it was stated that "the intrinsic (genetic) characteristics of any generation can be better than those of the preceding generation only as a result of some kind of selection, i.e. by those persons of the preceding generation who had better genetic equipment having produced more offspring, on the whole, than the rest. It was then stated that "under modern civilised conditions such selection is far less likely to be automatic than under primitive conditions" and hence "some kind of conscious guidance of selection is called for". This guidance should take the form of measures to increase the fertility of those with the qualities of health, intelligence and "those temperamental qualities which favour fellow-feeling and social behaviour" (Muller et al., 1939, p. 64).

Muller got a number of the leading geneticists of the day attending the conference to sign this manifesto, including J.B.S. Haldane, S.C. Harland, L. Hogben, J. Huxley and J. Needham and it was subsequently endorsed by a number of others. In the late 1930s there was a wide measure of consensus among geneticists that natural selection was no longer working effectively and that consciously designed selection would have to be introduced to prevent genetic deterioration.

10. Raymond Cattell and the Decline of Intelligence in England

In the 1920s and 1930s the issue of whether intelligence was deteriorating was taken up by a number of psychologists in the United States and Britain. Hitherto people like Galton, Pearson, Fisher and Huxley had relied on the growing evidence that there was an inverse relationship between social class and fertility. They assumed that there was a positive relationship between social class and intelligence and argued that this implied that the intelligence of the population must be declining. With the invention of the intelligence test by Alfred Binet in France in 1905, it became possible for psychologists to carry out studies to determine whether this was actually occurring.

The psychologist who did the most work on this issue was Raymond Cattell, a British psychologist who graduated in chemistry at the University of London, and then switched to psychology to do postgraduate work on intelligence with Charles Spearman. Cattell worked on the question of declining intelligence in the 1930s and set out his results in his book *The Fight for our National Intelligence* (1937). In this he made five principal contributions to the problem. First, he constructed and used a new type of “culture fair” intelligence test. Up to this time intelligence tests had been largely composed of vocabulary, verbal reasoning, and general knowledge questions, and critics were able to argue that performance on these simply reflected differences in education and social class rather than innate ability. Cattell's culture fair test consisted of problems in design and pictorial format, such as a randomly arranged set of pictures from a strip cartoon which had to be put into the correct temporal sequence. Cattell's new culture fair test measured what he was later to call -fluid intelligence- and improved the credibility of the test.

Second, Cattell collected normative data which showed the existence of a social class gradient for intelligence. According to his results, the mean IQ in the higher professional class was in the range

142-151; among minor professional and other white collar occupations, 115-137; among skilled workers, 97-114; among the semiskilled, 87-96; and among the unskilled, 78. This was one of the first studies to show that the assumption that the social classes differ in intelligence was correct. The range of these differences is rather greater than would be expected. The explanation for this is that Cattell's test had a standard deviation of 24 rather than fifteen, which later came to be adopted.

Third, Cattell made an estimate of the decline of intelligence. The method he used was to collect data on the intelligence of a sample of approximately 3,700 ten-year-old children and examine this in relation to their number of siblings. The result showed that the more intelligent the children, the fewer their average number of siblings, and from this Cattell inferred that the intelligence of the population must be declining. He calculated the rate of decline at approximately three IQ points a generation. Later studies in Britain by Sir Cyril Burt (1946) and Sir Godfrey Thomson (1946) reached similar conclusions.

Cattell went on to set out the consequences of the deterioration of intelligence for the quality of national life. He predicted a decline in educational attainment, in moral standards, and in cultural, scientific and economic life and in law-abiding behavior. Finally, he made some suggestions for eugenic measures to arrest the decline of intelligence, the most important of which were the provision of financial incentives for the more intelligent to have children and the more effective provision of birth control facilities for the less able.

A little over a decade later Cattell carried out another study on a comparable sample of ten-year-olds to see whether their average intelligence had declined. The result was that the average IQ had increased by 1.3 IQ points (1951). This was to be a common finding of a number of other studies and has come to be known as "the Cattell paradox". Cattell himself proposed that the explanation was that various environmental improvements had masked a real decline. He was correct in this, as we shall see in detail in Chapters 5 through 8.

11. The 1963 Ciba Conference

In the second half of the twentieth century, the theory that modern populations are deteriorating genetically and the associated belief that eugenic measures need to be taken to correct this began to lose ground. Nevertheless, prominent biologists and social scientists were still voicing eugenic concerns. In 1963 the Ciba Foundation convened a conference in London on the theme of *Man and His Future*. The conference included a session on eugenics at which papers were delivered by Hermann Muller and Joshua Lederberg, followed by a discussion. Muller, at this time a geneticist at the University of Indiana, restated his earlier views that genetic deterioration was taking place through the accumulation of harmful genes, which were ceasing to be eliminated by natural selection, and as a result of the inverse association between social class and fertility, which must be dysgenic because of the genetic superiority of the higher social classes. To counteract genetic deterioration he advocated the establishment of elite sperm banks which women wishing to have children would be encouraged to use, although several of the discussants expressed doubt about whether this facility would be widely taken up.

The second paper was given by Joshua Lederberg, professor of genetics and head of the medical school at Stanford. He began by restating the problem of genetic deterioration: "Most geneticists ... are deeply concerned over the status and prospects of the human genotype. Human talents are widely disparate; much of the disparity has a genetic basis. The facts of human reproduction are all gloomy - the stratification of fecundity by economic status, the new environmental insults to our genes, the sheltering by humanitarian medicine of once lethal defects" (p. 264). He went on to discuss how genetic deterioration in Western nations could be overcome and proposed that genetic engineering might offer a better approach than attempting to alter fertility rates in a more eugenic direction.

In the discussion that followed Julian Huxley was strongly supportive of the eugenic position. So also was Francis Crick, who began by saying that he agreed with the general eugenic case that genetic deterioration was taking place and that “I think that we would all agree that on a long-term basis we have to do something”. He proposed that it was time to challenge the belief that everyone has a right to have children, and suggested that a system of licensing might be introduced under which only those with socially desirable qualities would be permitted to reproduce. Alternatively, he suggested that because, by and large, people with high incomes had more socially desirable qualities, particularly those of industry, than the poor, a tax on children might be imposed which would act as a deterrent on the poor from reproducing but would have little effect on the financially better off (p. 274).

The Ciba Foundation conference of 1963 was to prove the high water mark of eugenics. Three of the most distinguished biologists of the time, Hermann Muller, Joshua Lederberg and Francis Crick, all of whom had won the Nobel Prize for their work on genetics, recognized the seriousness of the problem of genetic deterioration in modern civilizations and proposed methods for counteracting it. It was a high water mark from which the tide was to ebb rapidly. Over the next quarter of a century support for eugenics was to evaporate. By 1985 Daniel Kevles, a leading historian of the eugenics movement, pronounced that “eugenics is dead”.

12. The Decline and Fall of Eugenics

Throughout the twentieth century there had always been some who dissented from the eugenicists' concerns about the genetic deterioration of modern populations. In the 1930s Launcelot Hogben (1931) attacked eugenics for being based on social class and race prejudice. In the post-World War II years, Lionel Penrose was another prominent opponent. In 1945 Penrose was appointed to Galton Professorship of Eugenics at University College, London. He rapidly had the name changed to the Galton Professorship of

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Genetics, disputed the thesis that the intelligence of the population was deteriorating and denounced the “cult of eugenics” (1948, 1967). After 1945, the misuse of eugenics by the Nazis, in their mass sterilization program and the extermination of the Jews and gypsies, was used to discredit eugenics by people who maintained that eugenics inevitably led to the gas chambers (Kaye, 1987).

From the 1960s onward, eugenics became increasingly repudiated. The officers of the eugenics societies in the United States and Britain lost their nerve, changed the names of the societies and closed down their journals to dissociate themselves from the concept. Occasionally the theory of genetic deterioration and the need for corrective eugenic measures was restated, notably by Robert Graham (1970), William Shockley (1974) and Raymond Cattell (1972, 1987), but their work attracted little attention and virtually no favorable comment. Eugenics was attacked in three histories of the movement by Mark Haller (1963), Kenneth Ludmerer (1972) and Daniel Kevles (1985), all of whom argued that the whole eugenic case was misconceived, that the eugenicists did not understand genetics, that there were no genetic differences between the social classes, that the low fertility of the professional class was of no consequence and that no genetic deterioration was taking place. Kevles, in the most influential of these histories, *In the Name of Eugenics*, represented eugenics as a kind of crackpot religion in which Galton was described as “the Founder of the Faith,” Karl Pearson was dubbed “Saint Biometrika,” and Charles Davenport, the leading American eugenicist of the early twentieth century, became “A Worshipper of Great Concepts”. Kevles dismissed the growing acceptance of eugenics in the first half of the century with the phrase “the gospel becomes popular” and lost no opportunity to sneer at the eugenicists for being “obsessed by the pro-creational practices of others” (p. 286). Eugenics, according to Kevles, was based on “false biology” and there was no need for concern about a negative association between intelligence and fertility because hereditarian theories of intelligence had been disproved, an assertion that betrays astonishing ignorance. Nowhere did Kevles show any comprehension of the

genetic problems entailed by the breakdown of natural selection in Western populations, of the evidence pointing to genetic deterioration, the seriousness of this issue, or the validity of the concerns felt by eugenicists and their attempts to find solutions. Half a century earlier, Kevles' book would have been trashed for missing all the major points of the eugenic argument, but by the 1980s it was uncritically applauded by a sympathetic media. Extracts from the book were serialized in the *New Yorker*, and the *New York Times Book Review* described it as “a revealing study by a distinguished historian of science.”

By the last decade of the century eugenics had become universally rejected. In 1990 University College, London, appointed Steve Jones as head of the Galton Laboratory. Jones's expertise lay in the genetics of snails. He had no sympathy whatever with eugenics, and his view of Galton was that he was “a fascist swine” (Grove, 1991). Four years later a leading British geneticist, Sir Walter Bodmer, was to write of “the mindless practice of eugenics” (Bodmer & McKie, 1994, p. 236).

By the 1990s even the members of the former eugenics societies attacked eugenics. In 1991 the British Eugenics Society, by now blandly renamed *The Galton Institute*, devoted its annual conference to Francis Galton and his achievements, and the conference proceedings were later published, edited by Milo Keynes (1993). The conference consisted of lectures on Galton's various interests including travel, the weather, statistics, physical growth, fingerprints and education. Strangely absent was any lecture on eugenics, Galton's principal interest over a period of almost half a century. No mention whatever was made of Galton's views on the problem of genetic deterioration among Western populations and only a brief and dismissive reference was made by Keynes to Galton's ideas on eugenics. Keynes denounced Galton's ideas on the grounds that there are no genetic elites and therefore there could be no genetic gains in encouraging them to increase their fertility. These ideas, according to Keynes, were all wrong because Galton did not know of the work of Mendel: “Through his ignorance of Mendelism, Galton was un-

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biological when he thought that eugenic policies could be achieved by encouraging the fertility of families in which eminent men belonged” (1993, p. 23). As a matter of fact, Galton was not ignorant of Mendel's work and he paid tribute to it in his *Memoirs* (1909, p. 308). Furthermore, it is not necessary to know the details of Mendelian gene processes in order to breed better stocks. This has been done by animal breeders for centuries, as Galton pointed out on the first page of his *Hereditary Genius*. But by the 1990s this was no longer understood by the leading members of the former British Eugenics Society. The collapse of eugenics was complete.

13. Conclusions

In this chapter we have seen how in the second half of the nineteenth century Benedict Morel in France, and Francis Galton, Charles Darwin and Herbert Spencer in England realized that natural selection had largely ceased to operate in Western populations and that the result of this would be genetic deterioration. They understood that this deterioration was taking place for health, intelligence and character, and that the reason for this was that those who were deficient in these regards, who had previously suffered high mortality and had low fertility, now had reduced mortality and, in the case of intelligence and character, had begun to have high fertility. These Victorian biologists and social scientists perceived that the genetic deterioration resulting from the relaxation of natural selection could only be countered by some form of consciously planned selection. Francis Galton proposed the term *eugenics* for the study of this problem. In the early and middle decades of the twentieth century these ideas came to be accepted by many leading biological and social scientists, including Karl Pearson, Charles Davenport, Sir Ronald Fisher, Sir Julian Huxley, Sir Cyril Burt, Sir Godfrey Thomson, Raymond Cattell, Hermann Muller, Joshua Lederberg and Francis Crick.

From the 1960s a reaction against eugenics set in and by the last decade of the century the concept was virtually universally rejected.

Historical Understanding of the Problem

My objectives in this book are to show that the eugenicists were right in their belief that natural selection has broken down and that, as a consequence, genetic deterioration is occurring in modern populations; to present the evidence for this; and to assess the magnitude of the problem. It may be helpful to set out the framework within which this task is attempted. We look first at the root cause of the problem, the way in which natural selection preserved the genetic quality of the population in preindustrial societies (Chapter 2) and how natural selection has broken down in the nineteenth and twentieth centuries (Chapter 3). We look next at this breakdown in regard to health (Chapter 4), intelligence (Chapters 5 through 11) and character (Chapters 12 through 14), and then at the issue of genetic deterioration in economically less developed nations (Chapter 15). Chapter 16 discusses the dysgenic effects of emigration and immigration, and Chapter 17 presents evidence for the decline of the world's IQ. Finally, in Chapter 18, we consider the arguments against the view that Western populations are undergoing genetic deterioration, find them wanting and conclude that the eugenicists were right in identifying this as a serious problem, and one that needs attention.