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Harry Laughlin's eugenic crusade to control the 'socially inadequate' in Progressive Era America

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ABSTRACT Harry H. Laughlin, champion of eugenic sterilization, immigration control and an idealized eugenics-based world government, became superintendent of the newly founded Eugenics Record Office (ERO) in 1910. For thirty years, he co-ordinated the gathering and use of family pedigree information in order to maintain a healthy reproductive stock among the American peoples. He expended considerable energy categorizing the 'socially inadequate', a group that included the feeble-minded, the insane, criminals, epileptics, inebriates, as well as those suffering from tuberculosis, leprosy, venereal disease, blindness, deafness and physical deformities. Subsequently, he provided state legislators with the number of 'social defectives' within their respective constituencies. With the support of fellow eugenicists, he used statistical methods and genetic principles to persuade the majority of state legislatures that reproductive sterilization was the 'least objectionable' and the 'most cost-effective' solution for eliminating the socio-economic burdens created by the 'socially inadequate'. His rhetorical power helped him gain considerable public support and persuade many Americans that these efforts were well within the mainstream of Progressive Era science. Wilson argues that it would be prudent to review Laughlin's work at the present moment, when the services that the ERO provided are again or soon will be required in the application of Human Genome Project research to the population. Although the use of the term 'eugenics' has fallen out of favour, the theme of selective breeding remains, and birth control, prenatal testing and genetic screening all retain elements of Progressive Era eugenics. Contemporary medical genetics encompasses a vast range of initiatives that, like eugenics, is propelling us towards the elimination of hereditary disease, deformity and deficiencies.

KEYWORDS *eugenics, Eugenics Record Office, genetics, Harry H. Laughlin, immigration control, socially inadequate, sterilization, stigmatization*

In 1994 Richard J. Herrnstein and Charles Murray's *The Bell Curve* argued powerfully for racially distinct norms of inherited intelligence.[1] Accusations of prejudice shook the rafters over their claim that, since IQ was nearly all a matter of inheritance, neither striving to improve schools nor providing a

1 Richard J. Herrnstein and Charles Murray, *The Bell Curve: The Reshaping of American Life by Difference in Intelligence* (New York: Free Press 1994).

healthier nurturing environment would significantly alter individual intelligences.[2] Specifically, Herrnstein and Murray argued that their statistical evidence scientifically validated the long-held view, at least by some groups, that the black–white racial IQ gap is overwhelming and insurmountable. Authorities in many fields challenged *Bell Curve* claims by pointing to a number of factors ranging from erroneous statistical tabulations to an inherently racist agenda.

The Bell Curve resurrected earlier controversies that had stemmed from the labelling of particular segments of society. Although 'moron', 'idiot' and 'imbecile' were no longer official terms for levels of 'feeble-mindedness', Herrnstein and Murray redirected considerable attention towards American educators' modern attempts to stratify students according to mental performance levels. At the very least, the controversy surrounding this publication succeeded in provoking parents, teachers and educational policymakers to re-examine their views on the usefulness of classification by IQ tests in the classroom. Even teachers working in classrooms in which IQ testing was no longer the norm were challenged to rethink the intentions and consequences of more common standardized tests, ranging from the multiple grade basic skills tests to the Minnesota Multiphasic Personality Inventory.

Should it be surprising that similar established systems of measurement and stratification exist elsewhere in society? The nature vs. nurture debate has permeated centuries of theory and practice regarding health and disease as thoroughly as it has that regarding education. Within the biomedical community, these concerns underpin much of the framing of future health care policies as the human genome becomes unravelled. Notions that were discussed a few decades ago only within the Brave New World of science fiction are becoming possible realities for our reproductive future. Given the imminent quest for resolving problems associated with genetic disease, it becomes imperative to revisit previous scenarios in which, not so long ago, Americans grappled with similar ideas, albeit confined to more restrictive technological capabilities. If a more in-depth understanding of the recent past concerning the regulation of reproduction in the United States has any ability to inform the decisions that will shape the near future, then the time for such an investigation is upon us. This work begins by examining the context in which eugenicists reclassified the 'socially inadequate'—those individuals in Progressive Era America deemed the most threatening to the future of the 'American race'—and concludes with speculations about eugenic selective breeding in contemporary American culture.

Harry Laughlin's eugenic-mindedness

Midwestern America is once again embroiled in an ethical dilemma over selectively deciding who is fit and who is unfit for human reproduction. In July

2 Simon Fraser (ed.), *The Bell Curve Wars: Race, Intelligence and the Future of America* (New York: Basis Books 1995); Stephen Jay Gould, *The Mismeasure of Man*, rev. edn (New York: W. W. Norton 1996), 367–90.

1999 the cash-for-sterilization programme in Chicago, sponsored by the organization known as CRACK (Children Requiring a Caring Kommunity), was officially launched. This programme offers drug addicts $200 cash if they voluntarily submit to a tubal ligation, vasectomy or long-term contraceptive such as Norplant.[3] These drug addicts are but the most recent in a long line of individuals deemed 'social defectives' who have been targeted for sterilization. Early in the twentieth century, eugenicists encouraged the adoption of sterilization laws to control the reproduction of 'social defectives'. Many of these previous efforts owed their design and implementation to the superintendent of the Eugenics Record Office, Harry Hamilton Laughlin.

Harry Laughlin, champion of eugenic sterilization, immigration control and an idealized eugenics-based world government, began his career teaching agriculture, natural science and a course in early civilizations at his *alma mater*, Kirksville State Normal School (now Truman State University) in Missouri.[4] While teaching science, he became interested in the new field of genetics. Indeed, he was one of the first generation of thinkers to appreciate fully the rediscovery of Mendel's principles.[5] In 1865 the Czechoslovakian monk Gregor Mendel had experimentally determined some interesting facts about the transmission of visible physical characteristics using garden peas. Among these was his demonstration that a 'recessive' trait, such as whiteness in the flower of a pea plant, might visibly 'disappear' from one generation of the plant's offspring only to 'reappear' in later generations. Mendel's specification of dominant and recessive characteristics shifted the paradigm of thought about breeding patterns in domestic crops and animals, two subjects at the core of Laughlin's academic interests.

In his agricultural lab, Laughlin exposed his students to Mendelian concepts of heredity through breeding experiments involving some uncommon varieties of poultry. Desiring information for classifying his newly bred products, he contacted Charles B. Davenport, director of the Station for Experimental Evolution in Cold Spring Harbor, Long Island, New York, a Harvard-trained zoologist who had previously taught at the newly founded

3 The mission, objectives and current activities of Barbara Harris's CRACK may be found at www.cashforbirthcontrol.com (consulted 30 April 2001). Norplant, which gained approval from the Food and Drug Administration for use in 1991, consists of soft progestin-filled capsules implanted under the skin of the upper arm of a female patient under local anaesthesia (Bernard Asbell, *The Pill: A Biography of the Drug That Changed the World* (New York: Random House 1995), 325–46).

4 For substantial biographical material on Laughlin, see Frances J. Hassencahl, 'Harry H. Laughlin, "Expert Eugenics Agent" for the House Committee on Immigration and Naturalization, 1921 to 1931', Ph.D. dissertation, Case Western Reserve University, 1970; Philip R. Reilly, *The Surgical Solution: A History of Involuntary Sterilization in the United States* (Baltimore: Johns Hopkins University Press 1991); and Desmond King, *Making Americans: Immigration, Race, and the Origins of the Diverse Democracy* (Cambridge, MA: Harvard University Press 2000).

5 Charles B. Davenport is credited for introducing Mendelian genetics into the United States (Alan R. Rushton, *Genetics and Medicine in the United States, 1800 to 1922* (Baltimore: Johns Hopkins University Press 1994), 60–3).

University of Chicago. Davenport invited Laughlin to the Brooklyn Institute of Arts and Sciences to take his genetics course in the summer of 1907, later described by Laughlin as 'the most profitable six weeks that I have ever spent'.[6] The two remained in contact and, in January 1909, Davenport visited Laughlin while travelling to the annual Animal Breeder's Association (ABA) meeting in Columbia, Missouri. The ABA, a gathering of 'pragmatic farmers and university-based theoreticians',[7] had at the time forty-three different committee-interest groups, including one on eugenics chaired by David Starr Jordan, a renowned ichthyologist then serving as president of Stanford University. ('Eugenics', a term coined by the British polymath Sir Francis Galton,[8] described the 'science' of giving 'the more suitable races or strains of blood a better chance of prevailing speedily over the less suitable'.[9]) In addition to his experimental pursuits with poultry, Laughlin was keenly interested in 'breeding a horse that would never lose a race'.[10] However, at the ABA meeting, Davenport convinced Laughlin to turn his interests towards the hereditary study of another animal: humans.

Laughlin was already somewhat experienced in human genetic studies, having previously engaged his college students in gathering family data about traits that were presumed to be hereditarily influenced. An advocate of the pedagogical power of visual displays, he guided them in preparing their own family pedigree charts in an attempt to discern hereditary patterns in the repetition and variance of eye colour.[11] It was regrettable, Laughlin argued, that 'the study of humanity is not an exact science like chemistry'. For, by establishing such a science, he foresaw its practitioners taking young individuals, analysing their character and 'improving' them by 'supplying' qualities that were lacking and 'modifying' those perceived as 'abnormalities'.[12]

6 Daniel J. Kevles, *In the Name of Eugenics: Genetics and the Uses of Human Heredity* (Berkeley: University of California Press 1985), 102.

7 Reilly, 58; Barbara A. Kimmelman, 'The American Breeder's Association: genetics and eugenics in an agricultural context, 1903–13', *Social Studies of Science*, vol. 13, 1983, 163–204.

8 Francis Galton, *Inquiries into Human Faculty and Its Development* (London: J. M. Dent 1883), 24.

9 For the historical context of Galton's views, see Ruth Schwartz Cowan, 'Francis Galton's contribution to genetics', *Journal of the History of Biology*, vol. 5, no. 2, 1972, 389–412.

10 Harry H. Laughlin, 'Racing capacity in the thoroughbred horse', *Scientific Monthly*, vol. 38, 1934, 210–22, 310–21.

11 As a college student, Laughlin had advocated using expositions as a venue for publicly displaying knowledge (Harry H. Laughlin, 'School Expositions', *The School Journal*, 1899, 488–9). He published his eye colour heredity work with ten 'advanced students' in Harry H. Laughlin, 'Thremmatology in the Kirksville Normal School, and the nature of eye color in Man', *Missouri School Journal*, vol. 27, 1910, 160 a–d; see also Harry H. Laughlin, 'Honors for the Normal School and for Kirksville', *Kirksville Journal*, 1 January 1914: Harry Laughlin Collection, Pickler Memorial Library, Truman State University, Kirksville, MO, 'Character References, etc' folder, box E-1-3. Henceforth all references to the Harry H. Laughlin Collection will be described as 'Harry Laughlin Papers'; a useful finding aid entitled 'Guide to the Harry H. Laughlin Papers' is available both in print at Pickler Library and online.

12 Harry H. Laughlin, 'Ideal Young Man. Professor Laughlin Fixed Per Centage [*sic*] of Elements of Ideal Character' (unidentified newspaper clipping discussing Laughlin's address as high school principal, 1900–5): Harry Laughlin Papers, 'Miscellaneous' folder, box E-1-3.

Eugenics was not confined to academe, the scientific laboratory or the farm. Indeed, it was slowly permeating American cultural thought. Much of this social awareness of eugenics accompanied an increasing appreciation of Charles Darwin's account of change or evolution within society: what contemporaries referred to as Social Darwinism. Darwin had concluded his explanations of evolution by arguing that the greatest step humans could take in their own history would occur when they realized that they are not completely guided by instinct. Rather, they have the ability to control—at least to a certain degree—their own future evolution. The 'conservation of the best rac[ial] values, the development of superior family stocks, and raising the individual standard' were, Laughlin later argued, 'well within the range of [the] practical achievement' of assisted human evolution.[13]

Excited over the possibilities of applying Mendelian theories to the human population, Laughlin accepted Davenport's offer to supervise the new Carnegie supported Eugenics Record Office (ERO) at Cold Spring Harbor.[14] Laughlin relinquished his teaching post and, together with his wife Pansy Bowen Laughlin, moved to New York in October 1910. This fateful move altered not only Laughlin's career, but subsequently affected the reproductive lives of thousands of Americans.

ERO Superintendent

Laughlin and Davenport organized the ERO around several operational missions. Accordingly, the ERO was designed to:

- serve the interests of eugenics as a repository and clearing house;
- build up an analytical index of the traits of American families;
- train field-workers to gather data of eugenic import;
- maintain a field force actually engaged in gathering such data;
- co-operate with other institutions and persons concerned with eugenic study;
- investigate the manner of the inheritance of specific human traits;
- advise on the eugenic fitness of proposed marriages;
- and publish the results of research.

Ever the organizer, Laughlin co-ordinated the collecting and recording of family data through an extensive outreach programme. From 1910 through 1924, he and Davenport trained teams of field-workers in the principles of human genetics and provided them with skills necessary to gather extensive

13 Harry H. Laughlin, 'Differential Fecundity' (paper presented at Long Island Biological Laboratory, Cold Spring Harbor, NY, 7 July 1931): Harry Laughlin Papers, 'Differential Fecundity' folder, box E-1-3 (pp. 1, 2, 5).

14 For extensive historical accounts of the ERO, see Garland E. Allen, 'The Eugenics Record Office at Cold Spring Harbor, 1910–1940: an essay in institutional history', *Osiris*, 2nd series, vol. 2, 1986, 225–64 and Elizabeth L. Watson, *Houses for Science: A Pictorial History of Cold Spring Harbor Laboratory* (Cold Spring Harbor, NY: Cold Spring Harbor Press 1991).

family histories.[15] The field-workers were mostly young college-educated women. As political scientist Diane B. Paul has argued, women were 'especially well suited' for eugenic field-work.[16] They had the ability to form sympathetic relationships with families in order to persuade them to divulge familial information. Additionally, the women's 'intuition and sharp eye for detail' allowed them to assess 'swiftly and accurately' an individual's physical, mental and temperamental traits. And, alas, reproductive matters by convention fell within a woman's purview.

Relying upon his pedagogical prowess, Laughlin exposed field-workers to a series of lectures and lab activities on eugenics. Topics included chromosomal structure, anthropological measurements, elementary statistics and discussions of medical conditions deemed to be, at least in part, hereditary, such as skin pigmentation, insanity, cataracts and epilepsy. Readings centred on Brown University biologist Herbert E. Walter's *Genetics*,[17] and were also drawn from intelligence measurement authors Alfred Binet, Lewis M. Terman and Robert M. Yerkes. Additionally, Laughlin led students through an experimental study of cross-fertilized and pure-bred corn in order to allow them to uncover for themselves Mendelian laws of segregation and recombination of hereditary traits. In subsequent discussions, students used the visible evidence obtained from their corn experiments as analogies for the transfer of 'defective' traits and 'unfit' matings in the human population.[18] Students were also provided with ERO-established guidelines for making a eugenic study of a family. To gain experience in constructing actual family pedigrees among 'social defectives', students were sent on supervised educational visits to study the patient populations in nearby clinics at King's Ridge, Amityville, Letchworth Village and Central Islip. They also visited immigration control facilities on Ellis Island.

The seriousness of the goals shared by Laughlin-trained field-workers is represented in a popular ditty of the time:

> We are Eu-ge-nists so gay
> And we have no time for Play,
> Serious we have to be
> Working for Posterity.
> Trips we have in plenty too,
> Where no merriment is due.

15 For a telling account, see Amy Sue Bix, 'Experiences and voices of eugenics fieldworkers: "women's work" in biology', *Social Studies of Science*, vol. 27, 1997, 625–68. Laughlin claimed to have overseen the training of 258 field-workers between 1910 and 1924 (Harry H. Laughlin, 'The progress of American eugenics', *Eugenics*, vol. 2, no. 2, 1929, 3–16).

16 Diane B. Paul, *Controlling Human Heredity: 1865 to the Present* (Atlantic Highlands, NJ: Humanities Press 1995), 54–7.

17 Herbert Eugene Walter, *Genetics: An Introduction to the Study of Heredity* (New York: Macmillan 1914).

18 Harry H. Laughlin, 'A Corn Breeding Experiment: To provide laboratory material for students of human heredity' (n.d.): Harry Laughlin Papers, 'Corn Breeding Experiment' folder, box D-4-3.

We inspect with might and mane,
Habitats of the insane.
Statisticians too are we,
In the house of Carnegie.
If to future good you list,
You must be a Eu-ge-nist.[19]

State institutions were eager to host or hire ERO-trained field-workers who collected information about the ancestry of the insane, the feeble-minded, criminals, the diseased and the paupers housed therein. Data was organized on what were called Mendelian Blanks or family pedigree charts that contained information about the incidence of particular traits thought to be hereditarily linked. These traits included not only physically visible traits, such as eye and hair colour, but also the incidence of multiple births and birth defects including hare-lip and cleft palate as well as diseases such as tuberculosis and syphilis. Special talents in music, math, sports or invention were also recorded as were subjective assessments of mental ability. *Scientific American* recognized the ERO data as a true 'inventory of the blood of the community'.[20] It was hoped that analysing traits in the form of pedigree charts would enhance the understanding of inheritance patterns of particular diseases. This form of data collection also represented an early step in what patients eventually came to view as the depersonalization of medical practice, whereby the medical condition rather than the person suffering with the condition became the primary purview of physicians.

Laughlin also developed tools with which he could better educate the public about the principles of heredity. Few members of the public had ever seen a microscope, let alone used one to view a chromosome. He designed a 'germ plasm abacus' to illustrate physically the 'basic geography' of a human chromosome and to demonstrate by practical means the 'elementary mathematical principles' involved in the segregation and recombination of genes.[21] He also developed a chromosome model in the form of a pair of coil springs to demonstrate mechanisms whereby chromosome duplication and separation might occur.[22] This practical classroom and public forum device was useful in physically illustrating the structure and mechanisms that contemporary cytologists reported in their observations of cellular activity.

Like Davenport, Laughlin also demonstrated a profound ability in mathematics and statistics. At times, he incorporated statistics as a rhetorical device

19 E. Carleton MacDowell, 'Charles Benedict Davenport, 1866–1944: a study of conflicting influences', *Bios*, vol. 17, 1946, 3–50 (30). 'Eugenists' was used interchangeably with 'eugenicists' during Laughlin's career.

20 'The progress of eugenics', *Scientific American*, vol. 109, 1913, 459.

21 Harry H. Laughlin, 'Illustrating the structure and mathematics of the human germ-plasm', *Journal of Heredity*, vol. 11, no. 4, 1920, 185–9. 'Germ plasm' was the term then used to denote the substance that acted as a conduit carrying heritable traits from the parents to their offspring.

22 Harry H. Laughlin, 'The coil-spring properties of chromosomes', *Genetica*, vol. 28, no. 5/6, 1936, 126–45.

to persuade readers of the magnitude of particular phenomena. At other times, he used statistics to develop particular mathematical theories. This latter use is clearest in his formula of heredity,[23] created by Laughlin to determine the statistical possibility of multiple genes interacting to produce a particular measurable trait or quality.[24] Modelling the names for both his Special Theory and General Theory of heredity on Einstein's Special and General Theories of Relativity suggests that Laughlin viewed his calculations to be biology's monumental equivalent of Einstein's breakthroughs in physics.

Classifying the 'socially inadequate'

Following the Great War (the First World War), the United States had become globally recognized as a supreme world power. A concomitant need arose in the minds of many to maintain the healthy stock of the American peoples. Should the US population become less pure and 'infected' with socially undesirable traits, many argued that the country's political and economic stronghold would begin to crumble.

Fear was already looming before the war over the increasing numbers of 'degenerates' in the United States. State legislators deemed such individuals the 'greatest problem that confronts our nation', and they claimed the 'degenerates' were present in a greater number than anyone could count. Supportive of their concern, Laughlin and his field-workers provided legislators with quantification of the 'degenerates' who by their 'inferior blood' were viewed as a great and costly 'menace to society'.

Sociologists had long engaged in elaborate discourse over the '3Ds' of society (the defective, the dependent and the delinquent classes). By the mid-1910s many found this classification scheme to be too inclusive to guide specific actions towards improving societal discord. More precise definitions were needed to identify those special classes of society who:

> need special care, restraint or direction, who as a group do not contribute in net to the general welfare . . . but who on the contrary . . . entail a drag upon those members of the community who have sufficient insight, initiative, competency, physical strength, and social instincts to enable them to live effective lives without particular social custody.[25]

Typical of his immodest proposals, Laughlin sought to rectify this nosological nuisance, and he campaigned for the official adoption of the term 'socially inadequate' as a more precise designation of the '3Ds' within society. According to many ERO publications, Laughlin specified the 'socially inadequate' as including:

23 Harry H. Laughlin, 'The general formula of heredity', *Proceedings of the National Academy of Sciences*, vol. 19, no. 8, 1933, 787–801.

24 An extension of this theory became standard thinking in molecular genetics by the end of the twentieth century.

25 Harry H. Laughlin, 'The socially inadequate: how shall we designate and sort them?', *American Journal of Sociology*, vol. 27, no. 1, 1921, 54–70 (68).

- the feeble-minded;
- the insane;
- the criminalistic;
- the epileptic;
- the inebriate;
- the diseased, including those with tuberculosis, leprosy and venereal disease;
- the blind;
- the deaf;
- the deformed;
- and the dependent, including orphans, old folks, soldiers and sailors in homes, chronic charity aid recipients, paupers and ne'er-do-wells.

In 1917 Joseph A. Hill, Division Chief of Revision and Results for the US Bureau of the Census, solicited opinions from university sociologists as to whether the designation 'socially inadequate' should officially replace the '3Ds' in his Bureau's publications. Specifically, he wanted to know whether the shorter term was a) more accurately descriptive, b) less offensive and c) already in general use.[26] Hill sought to incorporate this input in a forthcoming Census Bureau *Directory of State Institutions*, a work that Laughlin had prepared.

Hill's correspondents corroborated the view that considerable ambiguity surrounded the use of all labels for social class distinctions. Brown University's G. Q. Dealey sought a better term than 'socially inadequate', one that would 'avoid a notion of stigma' and that would 'emphasize a constructive point of view'.[27] University of Pennsylvania's Carl Kelsey offered 'social debtor classes' or some similar term 'more or less equivalent to the word handicapped' as alternatives.[28]

Hill summarized his input to Laughlin in January 1918, claiming that the term 'socially inadequate' had been 'generally disapproved' by 'those whose opinion is entitled to the greatest weight in connection with a question of this kind'.[29] In his reply a month later, Laughlin reprimanded Hill for having contacted the wrong experts.[30] More appropriate consultants, Laughlin argued, would be those on 'state boards of charities' and those 'who deal in practical and scientific manners with the classes' in question. The opinion of such people, he asserted, 'should be given more weight than that of the professional sociologist'. Laughlin reminded Hill of the support he had previously

26 Letter from Joseph A. Hill to Edward T. Devine, 10 October 1917: Harry Laughlin Papers, 'Connecticut Survey' folder, box D-4-5.
27 Laughlin, 'The socially inadequate', 59.
28 Letter from Carl Kelsey to Joseph A. Hill, 12 October 1917: Harry Laughlin Papers, 'Connecticut Survey' folder, box D-4-5.
29 Letter from Joseph A. Hill to Harry Laughlin, 2 January 1918: Harry Laughlin Papers, 'Connecticut Survey' folder, box D-4-5.
30 Letter from Harry H. Laughlin to Joseph A. Hill, 9 February 1918: Harry Laughlin Papers, 'Connecticut Survey' folder, box D-4-5.

garnered from state governors, 'state boards of charities or control' and 'other eminent men of affairs' who readily supported adopting the expression 'socially inadequate'. Furthermore, he strongly urged the Census Bureau to 'take this opportunity to stand for progress' and 'cast aside' the 'old expression which modern institutional management and practical field study has outgrown'.

Two weeks prior to his reply to Hill, Laughlin had initiated another letter campaign to the sociologists that Hill had previously contacted as well as to other university professors and social philanthropists. This campaign received mixed support. Princeton's Frank A. Fetter claimed that Laughlin's inability to reach consensus lay in the problem that his ten classes of individuals were 'not exactly coordinate'.[31] That is, the group as a whole implied 'cross-classification'. Fetter suggested another term, 'asthenic', as a more precise description of 'any person belonging to any' of Laughlin's classes. George E. Vincent, president of the Rockefeller Foundation, offered the term 'social maladjustments';[32] Cornell's W. F. Willcox suggested either 'dependent classes' or 'public charges',[33] and the University of Chicago's Albion W. Small proposed various alternatives, including the 'subsocial classes', the 'incompletely socialized classes' and the 'defectively social classes'.[34]

What to do with such a melting pot of suggestions? Laughlin lost his initial battle as the '3Ds' were retained in the Bureau's *Directory*, but he continued his fight for reclassification. He gathered support from all but 3 of 576 state institutions and, in 1921, he published his proclamation for the use of 'socially inadequate' before the specific group of readers who had initially opposed such a change, the sociologists.[35]

Cleansing the 'germ plasm'

Although Laughlin repeatedly claimed that the basis for reclassifying the 'socially inadequate' was 'not primarily eugenical',[36] his new nomenclature precisely targeted the range of individuals over which eugenicists gained reproductive control.

Eugenicists viewed their work as well within the mainstream of Progressive Era science. The innovations of many, including Laughlin, stemmed from applying the methods of the newly developed field of statistics to observations in genetic breeding experiments. By doing so, Laughlin adhered to Francis Galton's guiding principle:[37] 'Before any branch of knowledge can aspire to the dignity of a science, its phenomena must be subjected to number

31 Laughlin, 'The socially inadequate', 58–9.
32 Ibid., 59.
33 Ibid., 57.
34 Ibid., 59.
35 Ibid., 54–70.
36 Ibid., 70.
37 Harry H. Laughlin, Personal notes (n.d.): Harry Laughlin Papers, 'Corn Breeding Experiment' folder, box D-4-3.

and measurement.' Heredity, through a statistical application of genetics was, according to Laughlin,[38] the 'latest of the series of natural forces to be captured and harnessed to do the bidding of a nature-conquering age'.

Many eugenicists increasingly turned their attention to determining ways to best relieve society of the burdens inflicted by the 'socially inadequate'. Among these, the 'feeble-minded' (a vaguely defined term describing individuals whose 'mental age' was considerably less than their actual age) seemed to be the 'greatest enemy'.[39] The Virginia State Board of Health reminded citizens that the feeble-minded 'furnished one-fourth of our criminals, forty percent of our abandoned women, and half of the inmates of our almshouses'.[40] Connecticut claimed that 25 per cent of its total state expenditure was directed to the care, maintenance and treatment of its socially inadequate citizens. Propaganda abounded popularizing the issue and drawing lines in this social warfare. Pennsylvania legislators deemed the feeble-minded to be the greatest problem that confronted the nation and claimed that they were present in 'a great[er] multitude' than anyone could count.[41] Supportive of their cause, Laughlin and his field-workers provided the essential ingredient that legislators had been missing: specific quantification of the feeble-minded and other 'social deviants' in their midst. Moreover, he provided them with a cure.

Laughlin persuasively advocated what he viewed as the best means of eliminating the social burden created by the social inadequates. The 'conscious striving for race betterment on the part of the socially inadequate', he argued, 'is impossible. . . . Therefore society must control their reproduction.'[42] It ought to be a 'eugenic crime', he claimed, to 'turn a possible parent of defectives loose upon the population'. As secretary to the Committee to Study and Report on the Best Practical Means of Cutting off the Defective Germ Plasm in the American Population, Laughlin issued the committee's report detailing ten possible 'cures' of the problem.[43] The solutions ranged from segregation to euthanasia, and the committee strongly favoured repro-

38 Harry H. Laughlin, 'The Growth of the Knowledge of Heredity' (n.d.): Harry Laughlin Papers, 'Work on Washington D.C. and World Government' folder, box E-1-3.

39 Considerable historical attention has recently turned to the 'feeble-minded', most notably in James W. Trent, Jr., *Inventing the Feeble Mind: A History of Mental Retardation in the United States* (Berkeley: University of California Press 1994) and Steven Noll, *Feeble-Minded in Our Midst: Institutions for the Mentally Retarded in the South, 1900–1940* (Chapel Hill: University of North Carolina Press 1995).

40 Bureau of Vital Statistics, State Board of Health, *Eugenics in Relation to the New Family and the Law on Racial Integrity* (Richmond, VA: Public Printing 1924), 8.

41 *Report of the Commission on the Segregation, Care and Treatment of Feeble-Minded and Epileptic Persons in the Commonwealth of Pennsylvania*, Legislation Pursuant to Joint Resolution, 14 June 1911.

42 Kevles, 108.

43 Other committee members and consultants included prominent New York lawyer Bleeker Van Wagenen, Johns Hopkins physician Lewellys F. Barker, Henry Goddard, the 'psychometrician' at the Vineland Training School in New Jersey who introduced IQ testing into the United States, Johns Hopkins geneticist Raymond Pearl, and Louis Marshall, leader of the American Jewish Congress.

ductive sterilization as being the 'least objectionable' and the 'most cost-effective' among them.[44]

During the Great War, Laughlin had pursued graduate work at Princeton University, receiving his doctorate in 1917 for his dissertation, 'On Mitosis in the Root Tip of the Common Onion', under the supervision of the renowned geneticist and cytologist, Edward Grant Conklin. Although his findings became foundational for future studies of the dynamics of cell division, they appear to be far afield from his interests in human heredity. However, a doctorate in genetics provided him the scientific stature needed for further recognition as an authority in eugenics. He used this recognition, together with his significant rhetorical skill, to convince many states to adopt a model law that he had drafted to serve as the official legislative instrument for the involuntary control of the reproduction of their institutionalized populations. By 1921, the year before the publication of Laughlin's book *Eugenical Sterilization in the United States*, 3,200 individuals across the nation were reported to have been sterilized. That number tripled by 1928, and by 1938 nearly 30,000 met this fate. More than half of the states in the United States adopted Laughlin's law,[45] with California, Virginia and Michigan boasting of their lead.

Laughlin's statute required that states provide operations 'in a skillful, safe, and humane manner', noting that, although compulsory in the institutionalized population, caretakers typically secured the full co-operation of the patient and his or her family.[46] This claim is corroborated in flyers distributed by the Human Betterment Foundation in Pasadena, California that cited patients and their families among the 'best friends of sterilization'.[47] More than others, they 'know by experience what its protection means to them'.

Laughlin also secured the staunch support of the United States judiciary. In a precedent-setting case, that of *Buck* vs. *Bell* in 1927, Supreme Court Justice Oliver Wendell Holmes, Jr. upheld the Virginia statute and claimed: 'It is better for all the world if, instead of waiting to execute degenerate offspring for crime, or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind.' In specific reference to the reputed feeble-mindedness of Carrie Buck and her ancestors, Justice Holmes deemed in words that have continued to ring loudly: 'Three generations of imbeciles are enough.' Following this pronouncement, Buck was reproductively sterilized against her will but in accordance with the highest law in the land.[48]

44 Reilly, 60.
45 Ibid., 97.
46 Harry H. Laughlin, 'Eugenical sterilization in the United States', *Social Hygiene*, vol. 6, no. 4, 1920, 499–532.
47 Entitled 'Effects of eugenic sterilization as practiced in California' (n.d.).
48 Court records were used as the basis of J. David Smith and K. Ray Nelson, *The Sterilization of Carrie Buck* (Far Hills, NJ: New Horizon Press 1989). Stephen Jay Gould has briefly addressed Carrie Buck's plight (Stephen Jay Gould, 'Carrie Buck's daughter', *Natural His-*

Popularizing eugenics

Laughlin spearheaded several efforts to popularize eugenics beyond the confines of the ERO. After witnessing the success of the first international congress on eugenics in London in 1912, he facilitated two additional international congresses: one held at New York City's American Museum of Natural History in 1921 and another at the same venue in 1932. Although aimed primarily at professionals, these conferences drew international attention to American efforts to curb the reproduction of 'degenerates' and promote the proliferation of the genetically well endowed. Laughlin also worked to keep the message of eugenics in the public eye. By 1928 some 376 college courses were taught on eugenics throughout the United States.[49] Numerous though these courses were, Laughlin realized that most Americans were not receiving their information about heredity at college. His greatest success in reaching out to the public came not in New York, but rather back in his midwestern homeland.

Laughlin organized a eugenics exhibit on the theme 'Pedigree-study in Man' as part of the Chicago World's Fair held in 1933 and 1934. Consistent with the Fair's 'century of progress' theme, Laughlin incorporated many recent eugenic advances within his exhibit. He created a series of panels that, when viewed according to a specific order, presented the principles of human heredity as a puzzle that exhibit-goers could unravel based on their own personal and family experience. To ensure that his exhibit caught the attention of every age and social class, he employed a variety of practical laboratory setups. Some stations were designed with midwestern farmers in mind, evoking parallels between human reproduction and livestock breeding or crop production. The socially elite were catered for with the 'Test for Instinctive Appreciation of Quality and Elegance'. In this test, ten fur samples of varying quality were placed on a table. Using score cards, fair-goers were asked to 'consider quality and elegance in relation to the appeal [that the furs made] to you personally', and then to rank the samples from best-liked to least-liked.[50] Their findings were then applied to corresponding charts that outlined how certain favourable traits in a human population could best be propagated.

Other panels warned observers that unfit marriages would only bring about defective offspring. Laughlin incorporated many pedigree charts showing that both desirable and undesirable traits were passed along family lines. Two pedigrees placed side by side drew particular contrasts between the presidential Roosevelt family and the 'degenerate' Ishmael family. By studying the

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tory, vol. 93, no. 7, 1984, 14–18), and much of the sentiment of this case, though not all factual, was portrayed in the 1994 made-for-TV movie, *Against Her Will: The Carrie Buck Story*. The 1994 Worldview Pictures Production documentary, 'The Lynchburg Story: Eugenic Sterilization in America', is considerably more accurate in its presentation of this case.

49 Garland E. Allen, 'The misuse of biological hierarchies: the American eugenics movement, 1900–1940', *History and Philosophy of the Life Sciences*, vol. 5, no. 2, 1983, 105–28 (116).

50 Letter from Harry H. Laughlin to Norman C. Meier, 23 March 1932: Harry Laughlin Papers, 'Chicago Fair-arrangements correspondence' folder, box D-2-4.

passage of ancestral lineage, viewers were urged to drop any lingering beliefs that marriage was purely a human choice and adopt the more socially desirable belief that responsible Americans pursued marriage mindful of eugenics.[51]

Laughlin's efforts reinforced those of another well-known contemporary, Margaret Sanger.[52] Sanger's popular writings of the early 1920s advocated birth control as one means of facilitating eugenic objectives. Her pro-eugenic leanings were evident in the motto of her journal *Birth Control Review*: 'to create a race of thoroughbreds'. Sanger publicly supported the eugenic aims in keeping unfit mothers from procreating. In one *Collier's* article, she argued:

> We are spending billions, literally billions, keeping alive thousands who never, in all human compassion, should have been brought into this world. We are spending more in maintaining morons than in developing the inherent talents of gifted children. We are coddling the incurably defective and neglecting potential geniuses.[53]

Following the second international eugenics conference in 1921 Sanger wrote a supportive response entitled, 'The eugenic value of birth control propaganda'. In it, she argued that the 'campaign for Birth Control is not merely of eugenic value, but is practically identical in ideal with the final aims of Eugenics'.[54] Although Sanger and Laughlin were mutually supportive of many eugenic ideas, Sanger eventually viewed Laughlin's influence in promoting compulsory sterilization as undermining her own endorsement of providing women the tools and power to control their own reproductive lives.

Immigration control

Corresponding with and appearing before state legislators apprised Laughlin of another growing national concern, the immigrant population. He developed strong ties with members of the House Committee on Immigration and Naturalization. The task of this committee was the formulation of immigration policy in US law. Comprised mainly of representatives from the South and the West, committee members had chiefly descended from families considered to be 'old stock' Americans. Many of the representatives, including Albert Johnson of Washington, chair of the committee, had pledged to their constituents an end to immigration. Such promises were never fulfilled. They had succeeded with a 1917 law stipulating that all immigrants pass a simple literacy test in their choice of languages before entering the United States. This bill, however, proved ineffective in stopping the massive influx of immigrants following the Great War's destruction in Europe.

51 For Laughlin's own account of the success of this exhibit, see Harry H. Laughlin, 'The eugenics exhibit at Chicago', *Journal of Heredity*, vol. 26, no. 4, 1935, 155–62.

52 For an investigation of the similarity of Laughlin's and Sanger's aims, see Gretchen Krueger, 'Genetically manipulating the population: the common goal of Margaret Sanger and Harry Laughlin', *Transactions of the Missouri Academy of Science*, vol. 31, 1997, 94.

53 Margaret Sanger, 'Is race suicide possible?', *Collier's*, vol. 76, 1925, 25.

54 Margaret Sanger, 'The eugenic value of birth control propaganda', *Birth Control Review*, vol. 5, 1921, 5.

The Republican government in the United States deemed that a more stringent law was necessary. Beginning in 1920 a series of hearings was held to identify problems that the new immigrants were causing in the country.[55] Laughlin, called upon as an expert witness, provided numbers of foreign-born immigrants, and compared this tabulation to the number of immigrants from each country in the general US population. He argued that the percentage of foreign inmates in US institutions should equal that within the state. However, his tabulations showed that certain immigrants, notably those from Southern and Eastern Europe, were significantly over-represented in these institutions. Laughlin's testimony contained a pro-eugenic bias. By examining only state institutions for the poor and insane, he was bound to discover more immigrants. The issue of wealthier 'old stock' families in private institutions was never raised. Laughlin informed the committee that the high number of socially deviant immigrants would ultimately destroy the racial purity of the country, thereby making it, in his words, 'ready for the grave nationally'.[56] Laughlin was appointed an Expert Eugenical Agent for this committee soon after delivering his testimony. Following the passage of a new immigration act in 1921 that set a yearly quota on immigrants from each country based on the 1910 census, Laughlin was recalled to testify. He presented a nation-wide study that concluded, once again, that groups other than 'old stock' Americans were contributing too many genetically inferior people to the population.

Recognized as his own country's chief eugenics agent, Laughlin was sent by the US Secretary of Labor as an Immigration Agent to Europe. He spent half of 1923 in Europe investigating emigrant-exporting nations, all the while remaining in contact with House Committee chairman Johnson. He spoke to eugenicists and consular officials to determine the feasibility of his immigration attaché plan whereby every prospective immigrant would be interviewed before embarking on the voyage to the United States.

Upon his return to the States, he testified again before the House Committee on the need for immigration reform. After considerable debate,[57] a new immigration law was enacted in 1924 establishing a yearly limit of 150,000 immigrants with each nationality allowed 2 per cent of their numbers as recorded in the 1890 census. The choice of this particular census was critical as it was the last one in which immigrants from Northern and Western Europe outnumbered those from the South and East who were believed to contribute more to the US pool of 'social inadequates'.

The end of the 1920s was the end of immigration's prominence. The ensuing Depression caused many of Laughlin's congressional allies, including Chairman Johnson, to lose their seats. Laughlin's actions and testimony have,

55 King, 166–95.

56 U.S. House Committee on Immigration and Naturalization, *Analysis of the Metal and Dross in America's Modern Melting Pot*, 67th Congress, 3rd session, 1922, series 7-C, 725–831.

57 Elazar Barkan, 'Reevaluating progressive eugenics: Herbert Spencer Jennings and the 1924 immigration legislation', *Journal of the History of Biology*, vol. 24, no. 1, 1991, 91–112 (97).

however, produced lasting effects. Most notably, by following the stipulations of the 1924 law, the United States continued to limit the influx of what were deemed 'undesirable' immigrants.[58]

The late 1930s proved a perilous time for many eugenic reformers in the United States. Laughlin was an extreme case. He had extended his influence as the US eugenics agent into Europe on three separate occasions. Germany so admired his unflagging dedication to controlling the reproduction of certain portions of the population that the University of Heidelberg—then the intellectual seat of the Nazi regime—awarded Laughlin an honorary doctorate of medicine in 1936. This honour, according to the accompanying citation,[59] was awarded for Laughlin's development of model laws that rationalized involuntary sterilization of defective persons as a valid exercise of the state's power to protect public health. This recognition, initially accepted as a token of his international reputation, later took on a different meaning. Once Germany rocketed towards war, the United States became increasingly concerned about its own apparent support of the very scientific principles that Germany used as a springboard to diminish the Jewish and other non-Aryan populations in their conquered lands. Many American medical, scientific and political leaders began to view the work of the ERO with increasing scepticism and embarrassment. After considerable reflection, the Carnegie Foundation formally closed the ERO in December 1939.

That same month, jobless and disheartened, Laughlin returned to Missouri. Here, where an outspoken young teacher strove for notoriety thirty years before, a retiring figure now longed for anonymity. No longer serving his country as an expert agent and fearing the tumult of another impending global war, Laughlin left the arena of human eugenics, favouring a more docile application of eugenics in his garden. Laughlin, the one-time Kirksville agriculture teacher once again had turned his hands to the Missouri soil as he daily tended his flowers. He died in January 1943, but his legacy remains powerful over a half-century later.

Laughlin's 'modern eugenic' legacy

Although the use of the term 'eugenics' may have diminished, the theme of eugenic selective breeding remains of paramount importance. Birth control is still a literal, if somewhat controversial, form of controlled breeding. Isn't selecting to abort a 'defective' baby merely eugenics placed in the hands of a parent? What about selecting against traits such as green eyes, short stature, brown hair, obesity, diabetes, cystic fibrosis or Huntington's chorea? Are there

58 Laughlin later expounded upon the success in curbing immigration in a Special Committee on Immigration and Naturalization report appropriately titled to evoke the threat he perceived immigrants posed to the United States, *Conquest by Immigration* (New York: New York State Chamber of Commerce 1939). Desmond King has deftly placed Laughlin's immigration plan within contemporary immigration discourse (King, 131–8, 173–95).

59 Harry Laughlin Papers, 'Honorary degree–University of Heidelberg, Germany' folder, box E-1-3.

not eugenic implications behind all prenatal testing and genetic screening procedures? The designer baby boom has never been so popular. Contemporary concerns over a super race may not have reached the Nietzschean heights of a century ago, but activity towards selectively designing super humans remains at the forefront of both biomedical and public discourse.

Have we, as a society, neglected to heed warnings about the eugenics practised before the Second World War? Scores of scholars have decreed that those who neglect the lessons of history are bound to repeat them. On the other hand, to play devil's advocate, perhaps history has taught us that eugenics should be welcomed. Human overpopulation is, according to environmental biologists, the greatest threat to our own future existence. Think of the finances that could be reappropriated if we could eliminate the dependent portion of our population, our modern 'socially inadequate': the homeless, the educationally challenged and the disabled. Social activists would, of course, have to be kept at bay, but could our own supreme judicial bodies once again help silence them through their rulings? Why should there be any argument over making individuals with superior genes? Hasn't exerting human control over nature—when it is seen to be in the best interests of humanity—been welcomed since the industrial revolution? Eugenics would narrow the range of genes in our collective human gene pool. The medical community could anticipate the precise genetic diseases that were likely to be encountered. Isn't this 'progress'?

Contemporary society regularly posits questions about race, cultural diversity and IQ, leading one to think that we may soon endeavour to develop a new genomic-oriented nomenclature for humans. Although the taxonomic identification of *Homo sapiens* need not change, further varieties, races, tribes or clans may need to be considered. Test-tube babies have proliferated, human clones are likely to be with us this decade, and super human designer babies are probably not far behind. To what extent do these 'likegened' individuals already represent actual clans or tribes among themselves? Would a nomenclature such as *Homo sapiens alpha*, *Homo sapiens beta* and *Homo sapiens epsilon* better help our brave new millennium delineate the genetic background and the expected cultural contributions of each tribe, as it did for Aldous Huxley in his 1932 vision of a Brave New World? Will babies of the future be forced, as the bard foretold in *The Tempest*, to accept King Alonso's challenge: 'Arise, and say how thou cam'st here.' To which they, like Prospero's daughter Miranda, might respond: 'O! Wonder! How many goodly creatures are there here? How beauteous mankind is! Oh brave new world, that has such people in't!'

Our technological abilities in genetics, especially molecular genetics, have 'jumped several quantum levels since the 1970s'.[60] The gene has become a

60 Cindy L. Munro, 'Genetic technology and scientific integrity', in Francis L. Macrina (ed.), *Scientific Integrity: An Introductory Text with Cases* (Washington D.C.: American Society of Microbiology Press 2000), 211.

cultural icon. Some scholars have argued that DNA in popular culture functions as the 'secular equivalent of the Christian soul. Independent of the body, DNA appears to be immortal.'[61] Visual cues of gender are no longer proof of being certifiably male or female; rather, DNA testing is available to verify your gender, as well as your genetic identity.

Medical genetics encompasses a vast range of health concerns from genetic screening and counselling to foetal gene manipulation to treating adults suffering from hereditary disorders. Reproductive investigations include the study of post-menopausal women becoming pregnant, *in utero* germ-line therapy, abortion by prescription, microsorting sperm for sex selection, post-mortem sperm selection and the custody of frozen embryos. As is well known, these topics are no longer just sensational tabloid reports. These areas of applied genetics consume ever increasing federal and private funds, and they represent issues that bioscientists will be called upon to testify about as 'expert witnesses' in the not so distant future.

Following the June 2000 announcement that the initial phase of the Human Genome Project (HGP) was complete, an increasingly audible public message was heard regarding genetic determinism (that is, human beings as merely the expressions of their genes). Genes, too, have increasingly become a target for blame. 'My genes made me do this.' 'I don't have the right genes to attempt that.' Or: 'Of course those people would do that, what else can we expect given their genes?'

To balance the global input into the HGP from the scientific side, one might think we would have, perhaps should have, an equally strong ethical input over regulating and overseeing the application of genetic technology. We are, after all, collectively moving towards the same goals of eliminating hereditary disease, deformity and deficiencies through our manipulations of the human form. On the bioethical side, however, US researchers in human genetics were in a much better position ten years ago than they are today. At that time, the National Institutes of Health (NIH) and the Food and Drug Administration (FDA) played a joint or hybrid role in overseeing the review of protocols for research in the blossoming area of human gene transfer. In May 1996 Harold Varmus, then director of the NIH, proposed an end to the NIH's participation in this oversight role, which came to pass, turning over the responsibility completely to the FDA. The most immediate effect was loss of transparency: the protocol review actually disappeared from public view. When the public was once again brought back into the picture some years later, in the mist surrounding Jessie Gelsinger's death, it was a case of too little, too late.[62]

61 Dorothy Nelkin and M. Susan Lindee, *The DNA Mystique: The Gene as a Cultural Icon* (New York: W. H. Freeman 1995), 38–57.

62 The inadequacy in government oversight of this situation became most widely known through a University of Pennsylvania case. In brief, the FDA had reviewed the protocol of a gene transfer for patients suffering from ornithinetranscarmamalase deficiency, a single-gene deficiency that caused a debilitating disease due to excessive build-up of ammonia in the liver.

This neglect of information handling is particularly troubling in areas of genetic technology, the biggest piece of the pie in government-funded science. It is also problematic in that being such a new venture, no precedent exists for this type of biotechnology. In many ways, it's on-the-job ethical decision-making as we go. Scientists may have grasped a stronghold at the molecular level, but we, as humans, have far to go in clearly establishing and communicating ethical guidelines surrounding issues of applied genetics.

Genomics has grown enormously, incorporating both laboratory and clinical research programmes as well as guiding the development of genetic counselling services. At one time, the ERO served to fulfil many of these needs. As projects surrounding the HGP continue to flourish, many eugenics related concerns are re-emerging as a new group of individuals impose regulations regarding the applications of genetic knowledge and technology upon humanity. With our present focus on the gene, we have become a society engaged in the 'study of agencies, under social control, that may improve or impair the social qualities of future generations either mentally or physically'.[63] That aim, according to Francis Galton, defined 'eugenics'. As these issues are being persistently paraded before the public through all forms of media, ERO-type missions may need to be redeveloped. In doing so, it would be prudent to review previous attempts, like those of Harry Laughlin, before selecting the next individual or agency to oversee such efforts.

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The first patient was enrolled in the study in April 1997, four months after the FDA completed an extensive overview of the situation. Eighteen months later, a patient in the study experienced a Grade III level toxicity upon receiving the fourth dose. This toxicity was neither immediately reported as protocol stipulated nor was the project on hold as previously agreed should such a situation arise. Another major lapse in following the protocol occurred eleven months later (in September 1999) when patient 019 (the Arizona teenager Jessie Gelsinger) was infused with a vector containing the gene even though his ammonia levels were perceived to be far too high prior to the gene transfer, and complications under such conditions were anticipated. Only after Jessie Gelsinger died following complications from this transfer did the ethical foibles come to the fore. His family expressed their hope that future medical breakthroughs would be 'free of conflicts of interest'. James Wilson, the director of the institute in which the treatment took place, became a multimillionaire from the stock he owned in Genovo, the company that funded the institute. The Gelsinger family argued in court that future human participation in gene-therapy experiments be free from 'bioethical missteps and inadequate government oversight'. The debate continues regarding if, when and how the lines of communication and the fulfillment of obligations broke down.

63 Francis Galton's definition, as published in *Probability, The Foundation of Eugenics* (London: Henry Froude 1907). For a brief overview of the derivation of this definition, see Karl Pearson, *The Life, Letters and Labours of Francis Galton* (Cambridge: Cambridge University Press 1930), iii.221–4.