

## INTRODUCTION

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# Data-Hereditry-Madness

### *A Medical-Social Dream*

The plan of the institution, the budget, the rules for its administration were not calculated merely to pursue cures for the mentally ill; science itself was also to be advanced.

—Report of a Rhine Asylum Committee (1830)

Heredity has an undeniably great importance for mental illness and psychical deficiencies. So it is no accident that attention was focused earlier and more intensely on the inheritance question in psychiatry than in any other area of medicine.

—Wilhelm Schallmayer (1918)

Genetics has been supported by compelling images. We think first of DNA, whose helical structure, announced in 1953, is still often exalted as the secret of life. For half a century before that, the science of heredity was identified with neat diagrams of green and yellow or smooth and wrinkled peas bred by Gregor Mendel in the garden of an Augustinian monastery.<sup>1</sup> The mutant eyes or wings of the fruit fly also assumed an iconic form. Images like these distract us from a science of mass reproduction. The agricultural breeding factories that already had sprung up before anyone cared about Mendel, and the industrialized laboratories of recombinant DNA, have never been appealing in the way of a ladder swirling heavenward. Graceful curves can only be part of the story. Let the reader cast an eye over the great filing cabinets of data from armies, prisons, immigration offices, census bureaus, and insurance offices that have been brought to bear on the topic of human heredity. Already by 1830, the investigation of heredity was saturated with numbers. A century later, the data of human heredity still were produced principally in two related institutions: insane asylums and special

schools for children who were called feeble-minded. DNA does not flow gracefully in unbounded space but is bent and twisted to fit onto stubby chromosomes. The science of human heredity arose first amid the moans, stench, and unruly despair of mostly hidden places where data were recorded, combined, and grouped into tables and graphs.

In practice, human genetics has always depended on mundane tools to classify and record bodily traits. Phenotypic heredity, which deals in quantities such as egg or milk production, IQ scores, and medical conditions, persists alongside the analysis of genetic factors that may be supposed to code for such traits. Its importance for breeding and other practical endeavors was and remains much greater than is commonly realized. Statistical techniques, from ordered lists and correlation tables to regressions and cluster analysis, have been fundamental to both sorts of hereditary research, genotypic and phenotypic. The public knows little of this. A bitter debate in the early twentieth century between “biometricians” and “Mendelians” about how best to study biological inheritance seemed to end in a victory for genetics, defined by a focus on discrete nuggets of hereditary causation for which Wilhelm Johannsen in 1909 coined the term “gene.” The new genetics emphasized microscopy, agricultural breeding, and model organisms. Despite geneticists’ intense engagement with eugenics and medicine, *Homo sapiens* was not their preferred organism. It was too resistant to laboratory manipulation and had too long a generation time in comparison to fruit flies, nematodes, and viruses. Historians of genetics, until recently, almost always echoed laboratory scientists and breeders in their focus on genes and then DNA.

This book brings historical focus to that other science of heredity, the tradition of amassing, ordering, and depicting data of biological inheritance, especially in humans. The deployment of hereditary data in medical and social institutions preceded academic genetics by about a century and continued thereafter as a set of tools and approaches loosely interwoven with classical genetic methods and understandings. In the dance of influence and appropriation, data work was never a passive partner, and in recent decades it

has reclaimed the limelight, supported by our present enthusiasm for Big Data. The Human Genome Initiative, sold with a promise to find the genes for talents, diseases, and every kind of personal characteristic, has returned to its roots as a data science. Historical writing on genetics, now tapping into the wider conditions of hereditary knowledge, has begun to pay more heed to data practices.<sup>2</sup>

These provided my inspiration for taking up this work. Karl Pearson, the subject of my previous book, combined extraordinarily wide-ranging intellectual ambitions with an unwavering commitment to statistics, eugenics, and “scientific method.” He also took data to be highly diverse and even personal. An invitation to contribute to an edited volume on the history of heredity prompted me to suppose that an inquiry into the sources of Pearson’s data might open up broader cultural dimensions. I found that experts on the treatment of the insane and feeble-minded in 1910 were not sleepily awaiting the magic touch of a geneticist or statistician to give meaning and purpose to their data. For decades already, asylum doctors had regarded themselves as medical scientists, and they took a vital interest in the role of heredity in reproducing the conditions they treated. My discovery of these efforts recapitulated Pearson’s own, as the institutions he looked to for data turned into sites of collaboration. Right from the start, his journal *Biometrika* published studies initiated by institutional doctors and psychologists and prison administrators. Although they engaged sometimes in fierce disputes, many were eager to adopt his tools to raise the statistical quality of research in which they were already engaged. He, in turn, readily acknowledged his dependence on them for access to human subjects and for diagnostic expertise as well as family data.

Pearson’s experience was echoed a few years later by Charles B. Davenport at the Eugenics Record Office in Cold Spring Harbor, New York. He held, in opposition to Pearson, that Mendel’s experiments on heredity of plant hybrids had changed everything. Beginning about 1908, he built up a vast data enterprise to identify Mendelian factors for the most disabling and costly human defects. He very quickly realized that on almost every topic

of practical importance, and especially for insanity and feeble-mindedness, hereditary investigation was already proceeding on a massive scale in special schools and asylums. Doctors and psychologists were as active as he was in developing the basic tools of hereditary data work.<sup>3</sup>

Davenport and his collaborators organized their pedigree data to reveal characteristic Mendelian ratios for the most worrisome mental conditions. Many in Britain and Germany as well as the United States were persuaded by his conclusions, to the point that hereditary research in psychiatry and psychology often required validation by these “Mendel numbers.” Early critiques, mostly from Pearson and his associates, gradually developed into a broad scientific rejection of Davenport’s work during the 1930s. Yet geneticists continued to teach basic Mendelism as the prototype for every sort of hereditary transmission, and the gene has sustained its supremacy in ordinary discourse. Molecular genetics, like other high-tech enterprises, has been fond of histories based on transformative discoveries. In the era of recombinant DNA and genomics, these continued to promise the discovery of the gene or genes that code for great abilities and dread diseases, with mental illness as a particular focus of interest. Grand historical narratives about learning the secret of life or an eighth day of creation have been written in support of scientific entrepreneurs and venture capitalists, that is, as present-day interventions.<sup>4</sup> Historians, too, write for the present, but (we hope) by challenging easy present-minded assumptions and by immersing themselves in primary sources and careful scholarship. The problem of gaining independence from the stories that scientists tell remains a pressing one for histories of genetics. History can provide the basis for a deeper understanding of the work of science, even in the present.

When I began this work, most of its characters were completely unknown to me. Commencing, innocently enough, with Pearson’s allies and collaborators, I began following my sources backward in time. While there can be no definitive point of origin, a few months of digging brought me to events in 1789 that could anchor my narrative. For a European historian, no starting point could be more

obvious. This one, however, was not the French Revolution, but the furor unleashed during a bout of madness suffered by King George III of England, the occasion for strenuous debates about insanity and recordkeeping. The decade that followed is well known to historians of psychiatry for the beginnings in France and England of a gentler and more hopeful “moral treatment,” which in turn provided a rationale for a vast expansion of Western asylum systems.

At first we detect no more than a shadowy premonition of those sprawling, amorphous, yet insistent institutions of medicine that now absorb limitless resources and intrude into every dimension of our lives. Yet by 1850, mental hospitals were becoming, in parts of Europe and North America, the costliest of social programs. We might think of them as a trial run for the welfare state, working to relieve the suffering of the mentally ill and to lighten the terrible burden on their families and communities. As sites of medical treatment, they soon appeared to be failing. Yet it was scarcely possible to set free or even to hold back the intake of so many thousands of deranged, unruly, inconvenient, and (at times) dangerous persons. The eugenics movement, which has so often been characterized as an (illegitimate) outgrowth of Darwinian biology, is better understood as a reaction to the failure of asylum care to check the hyper-Malthusian increase of the institutionalized insane. Alienists (as doctors for the mad were called) set out on the basis of statistics to ascertain the principles by which insanity was reproduced. About 1880, with the spread of mandatory schooling, a parallel crisis of “feble-mindedness” began raising alarms. Institutions founded to treat these conditions supplied not only the incentive for a science of human heredity, but also its experts and its abundant reserves of data.

The numbers were issued first in asylum reports and census tallies. They could then be deployed to assess the performance of institutions and to plan for the future. Bragging rights at the asylum depended first of all on statistics of cures, which provided legitimacy to the asylums. Their status as curative institutions, in fact, was never altogether secure. While legislatures and ministries shared the medical hope for treatment, they also were concerned to

maintain order in local communities. In practice, the asylums complemented and competed with prisons and poorhouses, promising better outcomes, but at an elevated cost. Many patients, especially in the early years, were brought to an asylum from such allied institutions, and some at least were discharged to them. A cure was highly advantageous from a budgetary standpoint, yet the abundance of reported cures did not suffice to reduce or even to stabilize patient numbers. Asylum doctors began to argue that the reduction of insanity was not within the power of medicine but must depend on public-health efforts. These, in turn, were to be guided by statistics of causes, which supported alienist preaching against alcohol, overwork, and masturbation. Right from the start, heredity sometimes appeared as the most fundamental source of insanity, and by the 1840s this view was widespread. Happily, heredity was not destiny. It was, on the contrary, singularly amenable to intervention, if only those contemplating marriage would pay heed to the mental health of the families of their intended partners.

Social medicine achieved an unwonted importance in the nineteenth century, especially for battles against epidemic disease. Insanity, too, was understood this way, and if, as the new alienists insisted, the appropriate treatment was “moral,” it made sense to emphasize moral causes. It was not even self-evident that treatment of the insane belonged in the hands of doctors. While they insisted on the curative power of their potions, they also wielded impressive behavioral technologies to maintain order: opiates to calm, painful “remedies” to punish unruliness, and better rooms or lightened restraints with the prospect of eventual release to reward good behavior. Although the asylum was a closed space, the battle against insanity reached out into the larger society. Data, especially on heredity, demanded a web of information to connect the prison-like interiors of these institutions with the towns and countryside stretching out beyond its walls.

Mental or psychological medicine was always only partly about cures. It was a statistical human science, increasingly focused on insanity as a social problem. Almost from the beginning, it addressed the hereditary characteristics of the healthy almost as much as

those of the sick. By the twentieth century, especially under the Nazis, the disregard for individuals appears ugly, but there had never been a clear boundary between collective and individual health. The investigation of inheritance of mental illness (“lunacy”) and intellectual disability (“feeble-mindedness”) was at once medical and social, reflecting the political orders of Europe and North America as they evolved from the 1790s to the 1940s and beyond.

As we enter onto this history, it is pertinent to note that, against all expectations, the history of data has become fashionable. Data manipulation now generates great fortunes, not least in medicine and science. Apart from social media and algorithmic marketing, genomics is among the most celebrated of big-data projects. University statistics departments unexpectedly find themselves no longer stereotyped as tedious data crunchers. Money and opportunity have transformed them into brilliant data crunchers, and “data science” into one of the most exalted and absorbing of vocations. Google and Amazon were not the first to imagine that data mining was the answer to every problem of knowledge. The data visionaries of the 1850s and 1860s, like so many in our own time, saw no fundamental distinction between scientific statistics and commercial or bureaucratic numbers. Human understanding, they proclaimed, can be relegated to a secondary role, and it is often more comforting not to dig too deeply.

On the ground, the accumulation and management of statistics has always been a humdrum pursuit, though teeming ambiguities lie hidden in data, and techniques of design and analysis are often highly ingenious. Since the rise of the state mental hospital in the early nineteenth century, ordered, standardized statistics have had a paradoxical relationship to the disorderly scenes of madness and of suffering that they are supposed to sum up. Behind the classical or Gothic asylum façade lurked misery and filth, and beneath the ordered statistical surface, perhaps, a chaos of tabulated unreason. The phenomena might be made to conform to the accounts, but rarely without a struggle. Data projects, often conceived in a utopian spirit, run up against quiet or even organized resistance. For history, the fascination of statistics arises not alone from its

technical power, but still more from its irrepressible human characteristics.

The three parts of this book correspond to three basic technologies of data and information. The first involves the introduction within asylums of systematic recordkeeping and the amassing of numbers into list-like tables. Data on heredity first materialized on the pages of case books and admission forms as answers to innocent medical-administrative questions about causes of illness. The doctors had no need to explain why they asked, since the assignment of a cause was already routine in medical case histories. Almost by instinct, nineteenth-century asylum doctors converted the marks in their case books into statistics, which in most cases required little more than totaling up the entries in each column of a registration book, or perhaps dividing them into numerical intervals, for example, of age. The resulting numbers were also calculated to inform and win over the public. The “supposed causes,” including heredity, had news value from the beginning, second only to the statistics of cures. The force of these numbers reflected the trajectory of asylum medicine, whose initial optimism proved fleeting. Cure rates began high and then declined, putting ever more pressure on the investigation of causes, hereditary ones in particular. Alienists wanted to cure patients, but they also had a key role in shaping infrastructures of public health. They looked to knowledge of causes as a guide in blocking the production of madness at its source.

These numbers stimulated efforts to improve and standardize tables. John Thurnam at the York Retreat in England gained an international reputation for his excellent tables and for some basic calculations. He also took a lead role in the drive to improve data on heredity by tracking down sick relatives of asylum patients. Another special focus of early statistical inquiries was the question of whether, as patient numbers seemed to imply, madness really was increasing. The French alienist Étienne Esquirol launched a debate by speaking of insanity as a disease of civilization. It was a discouraging finding, challenging hopes for progress by its suggestion that madness was bound to increase. The census of insanity was partly a scheme to settle basic questions of causation, and partly an admin-

istrative tool for planning public asylum systems. By 1840, several states had regularized such a census, and others thought their dignity required one.

Jules Baillarger's template for uniform data entry, published in 1844 in the new French journal of medical psychology, may be seen as a harbinger of a second wave of paper technologies for hereditary data, one that took off in the late 1850s. He aimed to make the table into a tool of research and reason. One clear sign of a more systematic approach is the push for standardized statistics, first in France, England, and Scandinavia. A more encompassing standardization appeared on the agenda of international statistical congresses as early as 1855 and was taken up more systematically in 1867. By 1871, this French-led effort had failed internationally, but it provided the basis for an impressive German initiative to integrate asylum statistics with census results on insanity throughout the empire. Still more consequentially, the Germans introduced in the early 1870s a flexible technology of census cards, one card for each individual, to be sorted and counted with simple hand movements.

In the end, however, the most important data work for the study of heredity was carried out on a smaller scale, at the level of individual asylums. Most asylum directors preferred the flexibility and the fine judgments made possible with long-term statistics from a single institution over simultaneous mass statistics from many institutions. The most promising technology of the new era, taking off about 1860, was the correlation table, which placed a variable that mattered on each axis, such as hereditary relationship and form of illness, in an effort to clarify causal relationships. Alienists also prepared intricate tables to test claims for hereditary degeneration and to measure the risk involved when the insane were allowed to reproduce.

Much of this work required elaborate systems to collect and process information from outside as well as within the institutions. Among asylum directors who took these investigations seriously, it was not enough merely to add up numbers accumulated to meet bureaucratic requirements. Now, data gathering was to be adapted to specific aims. Among the most impressive innovations in hered-

itary research from this era were the family pedigrees of mental illness published in Norway in 1859, more than three decades before pedigree tables emerged as the principal template for eugenic data. The author of this work, Ludvig Dahl, relied on intense local medical-social research, made possible by detailed census records.

The third phase of hereditary research, extending from the 1890s to the 1930s, began with the pedigree table, which then gave way to the full surveys of local populations. In this era, at last, we encounter famous researchers on human heredity, including Francis Galton, Karl Pearson, Charles Davenport, Wilhelm Weinberg, Ernst Rüdin, and Lionel Penrose. The eugenics movement took off about 1900, with Galton and Pearson as its most effective early advocates in Britain, and Schallmayer and Rüdin in Germany. Galton had been working toward a science of human heredity since 1865. If I surmise correctly, his ambitions were linked to asylum studies right from the start, and certainly by 1875. The biometric approach, emphasizing statistical tools for understanding the transmission of human traits, fit well with data work on inheritance of insanity and feeble-mindedness, and Pearson built up a considerable network of connections with doctors and alienists, most of them entirely friendly.

Mendelian genetics, which appeared suddenly on the scene in 1900, began to be integrated with asylum data on insanity and feeble-mindedness about 1908. In practice, this meant tracking down discontinuous variables, like Mendel's tall/short or smooth/wrinkled peas, for traits like mental ability that appeared to be continuous. Such traits should be distributed among siblings according to familiar Mendelian ratios, typically 3:1 or 1:1. By this time, many agricultural breeders as well as experimental biologists were insisting on the indispensability of Mendelian genetics. Its extension by Davenport to eugenic issues involved close collaboration with psychiatrists and psychologists. Few if any human geneticists gave up on Mendelism, but in psychiatric heredity, it was moving to the back burner by 1920. Rüdin's group in Munich, working statistically at "empirical hereditary prognosis," was at the top of the prestige hierarchy in the 1920s and early 1930s. Their research de-

pended on teeming files of data cards on family traits of asylum patients, students in special schools, and prisoners. These data files expanded by another order of magnitude under the Nazis. It is impossible not to see them as ominous. Yet Penrose, whose politics were diametrically opposed to Rüdin's, worked in the same scientific tradition, and for decades afterward, psychiatric geneticists continued to cite and to praise this German research until its alliance with Nazi policies came to seem too disreputable.

An appropriately critical reader will ask how this tradition of asylum statistics, if it was really as central to human genetics as I claim, could have remained in the shadows for so long. In the first place, this is not the tradition that postwar human and medical geneticists wanted to understand as their own. It was too tightly allied with eugenic interventions and with social and medical inquiries rather than distinctively scientific investigation. The new Mendelism, after all, coincided in time with a new discipline of genetics and soon became inseparable from it. Historians of biology at first took their lead from the historical verdicts of scientists, most of whom structured their histories in terms of theoretical novelties or experimental innovations without recognizing a role for such mundane recordkeeping. Although some of the twentieth-century characters in this book are well known to historians of genetics or eugenics, their data work has mostly remained in the shadows. Much is changed when we examine these figures from the standpoint of institutional and statistical practices. Once we take the numbers seriously, we must notice that mental hospitals and institutions for the "feble-minded" retained their status as key sites of hereditary investigation right through the 1930s and beyond. A focus on data lends specificity and concreteness to arguments about the relations of human genetics to eugenics, and more generally to ideologies of racial and social inequality. These are now often downplayed. Here, they appear as fundamental.

This book also reveals a much deeper history of human heredity, linking the twentieth-century story of statistics and genetics to a set of nineteenth-century developments that have rarely even been mentioned in histories of genetics. How could these vast

storehouses of data and statistics on heredity have remained so long unnoticed? This question is, for me, not at all rhetorical. More than three decades ago I wrote a dissertation and book on the history of statistical thinking from 1820 to 1900 without ever noticing the contemporaneous flourishing of asylum statistics. Part of the explanation is that these statistical discourses were somewhat isolated in their own time. It may be significant that medicine, as a profession, was in certain respects a closed world, and that asylum work was largely distinct from ordinary medicine. Although alienists did reach out to the public in hopes of altering behaviors that contributed to insanity, most of their work appeared in their own journals or in official reports of various kinds. Finally around 1900, when statistics of insanity, feeble-mindedness, and degeneration emerged as evidence of a crisis of modern life, alienists began to make common cause with biologists, statisticians, and social scientists for the sake of a future now shrouded in fear.

The research in this book proceeds on the supposition, for which it gives arguments, that the investigation of human genetics was and remains a human science. The human sciences treat schools, militaries, factories, offices, and hospitals as objects of investigation. To speak of asylums as the context for an emerging science of human heredity is not enough. These institutions took the lead in defining research problems, tracking down the human subjects, and selecting and training the researchers who gathered, analyzed, and circulated the data that gave shape to this science. Although much of it happened within walled spaces, the care—often the confinement—of the insane was closely watched by state ministries, health officials, political leaders, and directors of intersecting institutions such as poorhouses, prisons, and special schools. The objects studied, mostly human behaviors and bodily traits, were sensible to lay observers in a way that genes, molecules, and viruses are not. In a later phase of development, scientists and doctors could focus more intensely on more technical, less accessible objects of investigation. But hopeful or suffering humans continue often to intrude into the story, even when researchers preferred to write them out. There are drawbacks to treating medicine as technical.

Unless we reckon with the past of science, including its wide diversity of relevant actors, we cannot comprehend well the choices that defined the trajectory of human and medical genetics even in more recent times. Scientists have never yet built an impermeable laboratory space, not even for manipulating DNA. Neither can scholars and other citizens embrace a definition of science that sets it apart from history. The broader perspective I favor is evident in the outline of this book and intrudes everywhere in points of detail. This study, while advancing a large argument, seeks also to recover the texture of the past, which often is polyphonic or contrapuntal. The narrative includes extended discussions of developments in at least six countries (depending on how we count the German states) and scores of institutions. Since the research activity was highly decentralized, I can never assume without evidence that a medical paper, book, or institutional report, however brilliant, weird, or ingenious it appears to me, was readily made known to others engaged in the study of inherited mental defect. Yet the alienists of many lands saw themselves as allies in a shared endeavor. They sent around reports and journals, traveled repeatedly to other institutions both domestic and foreign, and engaged in extensive reviewing of meetings, reports, researches, and statistics.

This is the history not of a clearly demarcated discipline or scientific specialty, but of the circulation and reshaping of knowledge within a loosely structured yet self-consciously international field. I have framed it not as a comparative study of autonomous nations, but transnationally, in terms of systematic interchanges, from local to international. I do indulge some comparisons, but not always at the same scale. Individual asylums, as the story reveals clearly, had distinct cultures and traditions, of which they were keenly conscious. In many countries, including Germany and the United States, institutions were funded and regulated by states and provinces rather than by nations or empires. Comparison is thus possible at multiple levels. I have chosen not to privilege a single unit of analysis but to recognize stable entities (of whatever sort) where I find them, while emphasizing shared problem situations and ubiquitous exchanges. This is a history of professional knowledge in the world.

INTRODUCTION

It has been important for me not only to investigate places and genres of knowledge but also to identify the circumstances of their contact. Again and again, during the protracted process of writing, I was drawn back into sources to try to identify a connection, untangle an odd detail, or just dig up basic information about an event or a person in my story. Often, what I discovered went far beyond what I had sought. It was necessary to sacrifice many intriguing but wayward tidbits to maintain forward motion. This is not the story of a coherent enterprise, a group of researchers working at a single problem that could be solved or even formulated in a unified way. The characters here were loosely joined by a shared ambition to measure and comprehend outcomes of hereditary processes associated with mental disability. Their specific methods, techniques, and tools were diverse. Since this is not a novel, I cannot simply bring dispersed enterprises and characters together to tie up the loose ends. I have tried to be true to my topic, depicting as clearly as I can the scenes and forms of activity through which a science of human heredity took shape in asylums, clinics, schools, and the occasional laboratory. A stream of narrative explanation flowing straight to the sea without tributaries, pools, eddies, log jams, and storms would forsake its twisted splendor to be made more simplistic and less truthful.