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LEWIS MADISON TERMAN

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A Biographical Memoir by

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LEWIS MADISON TERMAN, for fifty years one of America's staunchest supporters of mental testing as a scientific psychological technique, and for forty years the psychologist who more than any other was responsible for making the IQ (the intelligence quotient) a household word, was born on a farm in Johnson County, Indiana, on January 15, 1877, and died at Stanford University on December 21, 1956, a distinguished professor emeritus, not quite eighty years old.[1]

When a biographer seeks to find causes for the events in the life that he is describing, he is apt to find himself facing the nature-nurture dilemma, uncertain whether, in order to account for the traits of his subject, he should look to ancestry or to environment. Terman, as it happens—when he wrote his own biography at the age of fifty-five (1932)—faced exactly this problem in accounting for himself.[2] In his choices he must indeed have been influenced by the *Zeitgeist,* for, as the weight of scientific opinion shifted from hereditarianism toward environmentalism, his judgment shifted too throughout the forty years (1916–1956) during which this issue remained vital to him.

[1] The best account of Terman's life up to 1931 is autobiographical: L. M. Terman, *A History of Psychology in Autobiography* (1932), II, 297–331. Briefer appraisals of his total contribution are: E. R. Hilgard, "Lewis Madison Terman: 1877–1956," *Amer. J. Psychol.,* 70(1957):472–79; R. R. Sears, "L. M. Terman, Pioneer in Mental Measurement," *Science,* n.s., 125(1957):978f.

[2] Terman, "Autobiography," pp. 297–305 *et passim.*

In 1916 Terman published what came to be called the Stanford Revision of the Binet test of intelligence, a test that measured intellectual growth in youth from three years of age to adult intelligence, which seemed to be reached at sixteen years or perhaps a little sooner.[3] The measure of intelligence that was supposed to remain invariant with age is the intelligence quotient, the ratio of mental age (average intellectual test-performance for a given age) to chronological age (times 100). That idea had been William Stern's in 1912,[4] but Terman, by improving the tests for mental age, was able to demonstrate that the IQ is indeed fairly constant with changing age, at least when cultural influences are also constant. If the IQ is constant from an early age, then adult intelligence is predictable from childhood, and it becomes easy to suppose that the intelligence measured is an invariant fixed at birth and quite possibly at conception by the genes. Terman was supported in this view by the growing realization at this time that feeble-mindedness cannot be greatly altered by training, and by the definition of *feeble-minded* in terms of the invariant IQ. The IQ was, of course, not strictly constant, but its variability and its regression toward mediocrity with advancing age could be laid to imperfections in the tests, perhaps to their lack of validity in measuring the fixed underlying intelligence in which so many had come to believe.

In the teens and twenties liberal opinion fought this view of a biologically elite intelligentsia, focusing attention on such changes in the IQ with age, education, and socio-economic status as were discovered. Terman, nevertheless, stuck to his original view. His initiation in 1921 of his genetic studies of genius, studies that were still being continued with the examination of the same group of gifted persons at the time of his death thirty-five years later, was based on his belief, which he got from Francis Galton, that the brains of the country are one of its great resources and that they can be selected with scientific

[3] Terman, *The Measurement of Intelligence*, 1916.

[4] William Stern, "Die psychologischen Methoden der Intelligenzprüfungen," *Ber. V Kongr. exper. Psychol.*, 1912, pp. 1–109, esp. on the IQ, pp. 25–29.

procedures and used to advance the national welfare and civilization. Thus in 1932, when he ventured to lay down eighteen articles of faith in a credo that he printed at the end of his autobiography, his eighth belief was "that the major differences between children of low and high IQ, and major differences in intelligence test scores of certain races, as Negroes and whites, will never be fully accounted for on the environmental hypothesis." [5]

As time went on this faith of Terman's in a basic invariant intelligence for every person weakened a little. The evidence that test scores for intelligence depend on socio-economic status increased. By the time of the Second World War the use of factor analysis to establish separate primary abilities, especially L. L. Thurstone's work,[6] had cast doubt on the unitary nature of intelligence. The I, as well as the IQ, was getting into trouble. Terman in his personal copy of his autobiography wrote in the margin opposite the sentence just quoted about Negroes and whites, "I am less sure of this now (1951)!" and later, "And still less sure in 1955!" [7] On the other hand, his continuing study of the gifted children, at last grown up after twenty-five years, reinforced his belief—in spite of a certain small regression of the top group toward mediocrity as age advanced and the realization that achievement depends on motivation as well as on intelligence—that there is in society under its ordinarily constant conditions an intellectual elite who need to be identified and specially trained and encouraged for the promotion of civilization.

It is hard to say whether Terman's faith in the importance of heredity made him, when he came in 1932 to assess the causes of his own success, discount the effects of environment, or whether, unable to see anything in his circumstances as a poor farm boy that could have led him into an intellectual life of national importance, he looked to heredity for an explanation because, being inscrutable, it could not disappoint him. Certainly he then seemed at pains to show

[5] Terman, "Autobiography," pp. 329f.
[6] L. L. Thurstone, *Primary Mental Abilities*, 1938.
[7] Hilgard, "Lewis Madison Terman," p. 478.

that there was nothing either in the commonplace of his rural youth nor in the agricultural lives of his immediate forebears that could explain the intellectual avidity that made him ultimately successful in the scientific world. Nor would his belief that heredity must be of great importance be weakened when his own son, F. E. Terman, was also elected to the National Academy of Sciences.[8] Lewis Terman must have believed that intelligence was there in his ancestors, undisplayed because the environment failed to yield or permit the necessary motivation.

Whatever their origin, this biographer sees two important characteristics that, appearing early in the life of Lewis Terman, supported him to the end. In the first place, he had tremendous drive and persistence that lasted in his pursuit of knowledge from the time he entered the Central Normal College in Danville, Indiana, at the age of fifteen, all through his life, in spite of setbacks with tuberculosis, being burned in a fire, breaking a hip, and other disabilities. Always he returned indefatigable and enthusiastic to his work. His views of it might change or the facts of nature might force a change; still he followed obstinately the same track, not with a dour stubbornness, but in a friendly, sympathetic, social activity in his contacts with colleagues, students, and his "gifted children." There is something special there that is part of his success.

The other characteristic that marked his life was his inextinguishable desire for reading, which began when he was about ten years old, at which time his brother bought a book on phrenology. (The man who was selling the book had felt Lewis's bumps and predicted great things for him.) Lewis read the *Britannica* in his father's library and most of the other tenscore books that his father owned. At the Central Normal College, when he was sixteen and seventeen, he was reading John Dewey's *Psychology,* Darwin's *Origin,* Huxley's *Lectures,* and other books of that sort. He read William James's *Principles of Psychology,* quite new then, surreptitiously because his in-

[8] Lewis M. Terman was elected to the National Academy of Sciences in 1928; his son, Frederick E. Terman, was elected in 1946.

structor disapproved of the book's literary flavor. Later, when he got to Indiana University, came under the influence of W. L. Bryan, E. H. Lindley, and J. A. Bergström, and decided to become a psychologist, his reading of the "right" things continued. While at Indiana he also mastered French and German so that, when he went to Clark University later, he could read adequately for Stanley Hall's seminar in three languages. This addiction to the use of books persisted until the end. Lewis Terman was a well-read man and not only within his special field.

Enthusiasm and tenacity, plus wide and well-chosen reading, seem to have been important factors in Terman's career. Nevertheless the autobiographer, as well as the biographer, faces an inevitable dilemma when he looks for causes of how his subject came to achieve eminence. If the biographer can find an environmental explanation he is apt to accept it *faute de mieux*. Often the acceptance of the alternative hereditarian explanation is due merely to the failure to find an environmental one, nor is the case proved by marshaling a few bright ancestors when all the other forebears have disappeared in the obscurity of the past.

With Terman it is possible to make a case for his inordinate will to achieve as a compensation for a frustrated youth, but that does not account adequately for his love of learning. Had he read only what would immediately promote his success, we could suggest that early frustration could be at work here too, but the fact is that he read more broadly, seemingly just for the joy of it, than his professional advancement ever required. Terman himself inclined toward an hereditarian explanation of himself, noting proudly his son's eminence. What he failed to note in this connection was the fact that his two older brothers did not rise so high, that his married sisters did not manage, in choosing their mates, to mark themselves off as exceptionally gifted, in the way that the bright girls of Terman's own "gifted group" did when they married. You have to take Terman as a fact. Considered alone he is not a good instance of environmental effect or of heredity.

Now let us see what are the facts that belong on this central core of the intellectual endeavor that is the key to an understanding of Terman's life.

YOUTH AND EDUCATION

Lewis M. Terman was the twelfth child among the fourteen children of James William Terman and Martha P. Cutsinger. James Terman was a farmer, the son of a Virginia farmer of Scotch-Irish descent who was born in 1794, fought in the war of 1812, migrated on horseback to Ohio about 1820, moved on to Indiana in 1846, taking James with him, and died there in his seventies shortly after the Civil War. This Terman, Lewis's grandfather, had married a woman named Jones of Welsh extraction. They had twelve children, of whom James was one of the youngest.

Martha Cutsinger, Lewis's mother, was the daughter of a Pennsylvania-German farmer who went from Pennsylvania to Kentucky and thence to Indiana. He had married a woman named Deupree of Huguenot origin. As a young man James Terman went to work for Cutsinger, married his daughter in 1855, and then moved away to a farm of his own in another part of the same county. Lewis, as we have noted, was born in 1877, after his parents had been married twenty-two years.

In this all-agricultural environment it would have seemed a safe prediction in 1890, say, when Lewis was thirteen, that he would become a farmer, marry young, have a large family who were destined to become farmers and farmers' wives except for a couple who would be school teachers, an alternative rural possibility. Lewis worked on his father's farm for five or six months every year from the time he was eleven until he was eighteen. He fitted easily into the work and did not dislike it, yet his avidity for knowledge was beginning to show and presently made the difference between a farmer and an intellectual. From the age of five to the age of thirteen he attended a one-room rural school of about thirty children and one teacher. He stayed on for a year after he had finished the eighth grade and ap-

parently spent the next two years on the farm. Perhaps this was the crucial moment, or at least what Terman himself would have regarded as the crucial moment, when he was led to decide that he wanted something that the farm would not provide, something that he could get at the Central Normal College at Danville.

Terman must later have come to believe that his success in the intellectual world of science meant that he himself was a "gifted child" in the phrase that he later coined in his genetic study of genius, that he had superior intelligence that could nevertheless have remained submerged under the routine of a farmer, where industry is repetitious and originality is confined to those small inventions that never emerge to alter even slightly the course of civilization. No wonder he believed so firmly that genius needs to be discovered, directed, and reinforced.

In 1892, when Lewis was fifteen, his parents sent him to the Central Normal College. He stayed two years, for thirty weeks the first year and twenty weeks the second. Then he taught a one-room rural school for a year and went back to the Central Normal College the next year for forty-eight weeks to complete the "scientific course" and receive the degree of B.S. After that he taught a rural school again and went back to the College, this time for eighteen weeks to complete the course in pedagogy and receive the B.Pd. degree. Still his eagerness for more and more education was not satisfied, so now, without stopping to earn more money, he borrowed enough to spend forty-eight additional weeks at Danville, thus completing the "classical course" to receive an A.B. Altogether he had spent one hundred sixty-four weeks at the Normal College, had three degrees to show for his work, yet remained vague as to what the future held for him.

Terman was now twenty-one years old. For the next three years he was principal of a township high school where he taught all the courses to about forty pupils. After the first year he married Anna B. Minton, a teacher whom he had met at Danville. Their son Frederick was born the next year. Both Lewis and Anna were sure that Lewis needed more schooling.

By this time Terman had decided that he wished to prepare himself to teach pedagogy and psychology, and he looked to Indiana University where W. L. Bryan, the Stanley Hall-trained psychologist from Clark University, was teaching. Indiana University was only fifty miles from his home. His friends advised him to go there to get a better A.B. than the Normal College could confer. To do so he had to borrow money again, though living in Bloomington was relatively cheap.

At the University he found, besides Bryan, E. H. Lindley and J. A. Bergström, both of them, like Bryan, Clark Ph.D.s. After Terman's first year Bryan became President of the University and was lost to Terman. Bergström was not so easy to know, but Terman came after a while to appreciate him and also to realize that experimental psychology, Bergström's *Fach,* was not for him. Terman was awkward with apparatus and never could learn to adapt himself to the mechanical phases of psychology's then new experimentalism. Especially Terman liked Lindley, who presently was steering him in the direction of Stanley Hall and Clark.

At Indiana, Terman improved his French and German so that he could read the literature in psychology without great difficulty. He became quite excited over the new scientific movement in German psychology, even though he was not prepared himself to become an experimentalist. He read a great many more books, received a solid Indiana A.B. at the end of his first year, an A.M. at the end of his second, and borrowed $1,200 more to go on to Clark University and a Ph.D. with Stanley Hall. Hall was still one of the giants of the new American psychology, a contemporary of James's, almost twenty years older than Cattell and Baldwin, the founder of the first American psychological laboratory and the second in the world. No wonder Terman's ambition soared at the thought of a Ph.D. with Hall.

It was in the spring of 1903 that the Termans had their second child, a daughter, Helen (now Helen Terman Mosher and living in Stanford). Little Fred was then almost three. Yet neither Terman nor his wife demurred about taking this family of four to Clark on

a borrowed $1,200 for a Ph.D. which turned out to be two years away. Terman owed his success not only to his own courage and ambition, but also to his wife's courage and her identification with his ambition.

The two years at Clark, when Terman was twenty-six to twenty-eight years old (1903–1905), were wonderful years for the farm boy so avid for education and now at last within sight of a Ph.D. He wrote of the University:

"The Clark of my day was a university different in important respects from any other that ever existed in America—. . . in spirit much akin to the German university yet differing from it because of the small student body. It enrolled in all its departments only about fifty full-time students. . . . Possibly thirty of the fifty were there primarily for psychology, philosophy, and education. The informality and freedom from administrative red tape were unequalled. The student registered by merely giving his name and address to President Hall's secretary. He was not required to select formally a major or minor subject. There was no appraisal of credentials for the purpose of deciding what courses he should take. *Lernfreiheit* was utterly unrestricted. There were professors who proposed to lecture and there were students who proposed to study; what more was necessary? The student could go to three or four lectures a day, or to none. No professor, so far as I could see, kept a class list. Attendance records were, of course, unheard of. No marks or grades of any kind were awarded at the end of the year or semester. One could attend a course of lectures all year without being required or necessarily expected to do the least reading in connection with it. There were no formalities about candidacy for a degree. The student was allowed to take his doctor's examination when the professor in charge of his thesis thought he was ready for it. No examination except the four-hour doctor's oral was ever given." [9]

Yet *Lernfreiheit* was not quite so easy as it sounds. Terman de-

[9] Terman, "Autobiography," p. 313.

scribed the intense motivation generated by the demand for a report in Hall's famous Monday evening seminar. The reporting student who did not weather the storm of criticism from his peers, reinforced as it might be by the deliberate and recondite negatives of the seminar's famous moderator, might go home for a week in bed, and one in Terman's day had a nervous breakdown when he realized his failure.

At Clark, Terman had contact with E. C. Sanford, the experimentalist, but it did not make him apparatus-apt. He sat under W. H. Burnham and heard his polished lectures on education and educational psychology, and he learned to perceive the beauty of an English style that Hall did not have. (Perhaps his own later facility as a clear and interesting writer owes something to Burnham.) From every quarter he felt the influence of European psychology as it went on in Germany with the new laboratories, in France with Binet and the measurement of intelligence, in England with Galton and the mental tests. Hall was, of course, his chief stimulus, though Hall did not support Terman in the two subjects of his special interest: the mental tests and the study of superiorly intelligent children. Hall was, however, never coercive, and Terman chose for his thesis the comparison of seven dull with seven bright children by the use of a great number of tests of Terman's own devising. Earlier Terman had presented to Hall's seminar a survey of the history of belief about bright children, how they had come to be looked down upon and regarded as instable and abnormal, likely to be a weight upon society instead of an aid to it. This view Terman intuitively opposed, and he set himself to test it by devising tests for bright children. Thus his principal life endeavor began at Clark in 1904. He took his Ph.D. under Hall in 1905, when he was twenty-eight years old.

MATURITY

Terman's life is so associated with difficulties of health and accident that inevitably a biographer pauses to wonder whether the

effort to overcome the obstacles may not indeed have encompassed other activities and have been one of the causes of his success.[10] At any rate the road to achievement, after he had obtained the Ph.D. at Clark, was no easier than the road he had already traversed.

The chief enemy was tuberculosis. There had been hints of it in 1899 and 1900, but the first serious hemorrhages occurred in the summer of 1904, in between the two years at Clark. He rested a few weeks and then took special care of himself during his second and last Clark year. He knew he needed to find a position in the south or southwest, but that requirement did not daunt him, for Stanley Hall was so closely identified with what was then the modernization of education under the impact of the new psychology that many of his Ph.D.s took administrative or teaching positions in normal schools or high schools. That kind of position could be found where the climate would be favorable, as might not have been the case for a university post.

Within three days Terman had opportunities to go to Florida, Texas, and San Bernardino, California. He chose the last, going there as a high school principal. He had another hemorrhage a few weeks after the term began, but he rested for eleven days and was soon back at work. What he regarded as a successful year ended with an offer of a professorship of child study and pedagogy at the Los Angeles State Normal School, an offer which he accepted.

He was at Los Angeles for four years (1906–1910). The library was good. The work was interesting. There were other psychologists there who stimulated him—Arnold Gesell and Beatrice Chandler, who later married each other. There grew up a friendship with

[10] Quite early experimental psychologists discovered that a supposed distractor of the attention does not always distract but may act as a motivator so that the effort to resist distraction actually spurs the attention, and achievement is improved by that which was expected to interfere with it. See, for example, A. J. Hamlin, "Attention and Distraction," *Amer. J. Psychol.*, 8:3–66, and M. A. Tinker, "A Study of the Relation of Distracted Motor Performance to Performance in an Intelligence Test, *Amer. J. Psychol.*, 33:578–83. Alfred Adler's conception of compensation for sensed inferiority is a similar principle.

E. B. Huey, an old Clark man. In the summer of 1907 the Termans, the Gesells, and Huey were together on vacation. Later, when Huey was working in Adolf Meyer's clinic at Johns Hopkins, and Terman was about to move to Stanford, Huey urged Terman to undertake work with the new 1908 Binet scale for measuring intelligence—and Terman did, publishing the Stanford revision six years later.

Bergström, by whom Terman had been taught at Indiana, was called to Stanford in 1909 as a psychologist in the Department of Education, but he died before the year was over. Stanford then asked Huey, who decided, however, to stay with Adolf Meyer a little longer. After that Stanford turned to Terman, a third Stanley Hall man, and he accepted.

Terman went to Stanford in 1910 as an assistant professor of education in E. P. Cubberley's department, and was promoted to be an associate professor in 1912 and a full professor in 1916. These first twelve years (1910–1922), before he was given the Department of Psychology to build up, were for him still maturational. He was changing from a psychotropic educationalist—the Stanley Hall model—to a sociotropic psychologist. He published three books on health and school hygiene—"If you scratch a health reformer, you will find an invalid," he used to say—but his enduring achievement was the revision of the Binet scale for measuring intelligence.

Up to 1916 Terman's identification had been largely with educators and educational psychologists. He had felt himself to be on, or just beyond, the periphery of the American movement in psychology, as so many of Stanley Hall's men were—the American movement that had its core in experimentation, the new laboratories, and basic fact, the "brass-instrument" psychology, as James called it. Terman at Stanford, disliking the brass instruments which existed across the way in Frank Angell's laboratory, was intellectually and geographically remote from this core of psychology. He was a "mental tester," and the experimentalists looked down on his art, some because it had little to do with consciousness and some because it was applied science. All that was shortly to change.

It was in 1916, the year of the publication of the Stanford Revision of the Binet scale, that Terman went back east to teach in the summer session at New York University. The next summer he taught at Columbia. At that time he actually was not a member of the American Psychological Association, so peripheral did he feel, but he joined in 1917. It was in April, 1917, that the United States declared war on Germany and that the psychologists mobilized themselves to see if they could render aid, especially by testing recruits for intelligence. R. M. Yerkes, because he was then President of the American Psychological Association and also because he was peculiarly well suited to the task, took charge, and late in May a committee of five distinguished "mental testers" met at Vineland, New Jersey, to plan for the psychologists' war effort. Terman, who was one of these five, stayed with the work and finally, in uniform and commissioned as a major, was responsible for the 200,000 words of Part II of the mammoth report that was published in 1921, *Psychological Examining in the United States Army*.[11] Hardly had he become a member of the American Psychological Association than he was elected to its Council (1919–1921) and then to its presidency (1923). The psychologists liked Terman and they came—even the conservatives who had contemned mental testing—to respect his ability. Thus the shift of Terman from the periphery of professional American psychology to its core was very rapid in these half dozen years.

In 1922 President Wilbur of Stanford asked Terman to become Executive Head of the Department of Psychology, because of the retirement of Frank Angell, one of Wilhelm Wundt's students, who had been in charge of Stanford's laboratory for thirty years. Terman accepted and his title was changed to Professor of Psychology and Education. This was the sort of challenge to which he would rise with all his drive and energy. The old department had granted only one Ph.D. in the thirty years of its existence. Terman's job was to

[11] *Psychological Examining in the United States Army*, ed. by R. M. Yerkes, *Mem. Nat. Acad. Sci.* (1921), vol. 15. Terman was responsible for Part II, "Methods of Examining: History, Development, and Preliminary Results," pp. 293–546.

build it up, and build it up he did. By 1949 three members of his staff, besides himself, had become presidents of the American Psychological Association and members of the National Academy of Sciences: W. R. Miles, C. P. Stone, and E. R. Hilgard. Of the Stanford students who were there during Terman's incumbency, four more became presidents of the American Psychological Association and two members of the Academy (H. F. Harlow and Heinrich Klüver). From the point of view of Academy representation in psychology, Stanford in the Terman period ranks among the five top institutions. From 1922 to 1942, when Terman retired, the Department of Psychology conferred 55 Ph.D.s. Certainly the scientific contribution of Stanford in psychology passed in this period from little significance to great. The growth could not, indeed, be all Terman's doing. Such developments, once started, are autocatalytic. One good appointment favors others, but Terman's tolerant appreciation of scholarship in any field of psychology, his constant effort to get the best men and then to treat them with a permissive democracy, established a philosophy that made Stanford a very good place to be. He got the process of change going and then steered it until he retired.

Terman took great pride and personal interest in his students and in other students too, for whom he acquired a preceptorial relation, and also in his younger associates on the staff, many of whom had been appointed as the result of his efforts. A list of these students and associates includes many names of great importance in present-day psychology. A score of them we can list here. In 1942, on the occasion of Terman's sixty-fifth birthday, a group of these persons issued a volume, called *Studies in Personality,* to commemorate their debt to Terman for his stimulus and sponsorship. Contributing to the volume from among his graduate students, who wrote their theses under his direction, were Barbara S. Burks, Florence L. Goodenough, Catherine Cox Miles, R. R. Willoughby, and Kimball Young. Contributing from among his other students and protégés, all persons who felt a very real and almost filial debt to him, were

R. G. Barker, Franklin Fearing, H. F. Harlow, L. P. Herrington, E. Lowell Kelly, John L. Kennedy, Heinrich Klüver, Ann Magaret (now Garner), F. L. Ruch, R. R. Sears, Eugene Shen, Miles A. Tinker, and Clare Wright (now Thomson). Signing the salutatory preface were, from among his graduate students, R. G. Bernreuter, Quinn McNemar, and Maud A. Merrill, besides Miss Goodenough, Mrs. Miles, and Kimball Young. To these names one ought at the very least to add John W. Gardner, Donald G. Marquis, and Neal E. Miller. An able and distinguished group this, all of whom had felt Lewis Terman's stimulus and stood ready to do him honor.

INTELLIGENCE AND THE GENETIC STUDIES OF GENIUS

Terman's lifework, the persistent core of his scientific contribution, was the study of the nature of exceptionally high ability. He first acquired this interest, so he claimed, in his work with Lindley at Indiana University in 1902. It was, as we have seen, the subject of his thesis in 1905 at Clark University with Stanley Hall. His chief concern was at first with bright children, and in this attack he was driven by his conviction of the falsity of the common belief that brightness in children is undesirable, that the very bright children are apt to be sickly or weak or neurotic or maladjusted. Later, as his research continued to support his conviction, he denounced the conventional thesis and speculated, as had Francis Galton before him, on how to increase the number of gifted children in the community, how to discover them and to make their ability available to society.

When Terman came to Stanford in 1910 he had the opportunity to begin serious work on this topic. Since the Binet-Simon scale of intelligence had appeared in 1908, he now had at hand for the selection of bright children a means that had not been available when he was at Clark. In 1911 he selected from certain schools a group of 31 children with IQs in excess of 125, described their abilities and characteristics then, and undertook to see what happened to them later. By 1924 one of these children had a Ph.D., another an Sc.D., and a third was studying in Europe.

Terman's own revision of the intelligence scale in 1916 gave him a still better tool for the selection and for charting the development of the tested children as they grew into adulthood. It was becoming plain that it was important not only to show that bright children are not queer and maladjusted but also that they grow up, with IQ fairly constant, into valuable, competent, bright adults. It was in this way that the study of gifted children changed into the *Genetic Studies of Genius,* as Terman called the big volumes, filled with facts, that came out during the last thirty years of his life.

In 1921, just before he became executive head of Stanford's Department of Psychology, Terman secured his initial support from the Commonwealth Fund for the selection and study of a thousand gifted children from the schools of California. Terman and his associates could not test the entire school population of California—about 160,000 pupils—but they had the teachers select the three brightest children in each class, according to the teachers' judgment, and they also took the youngest child in each class. This last criterion turned out to be the best. These selected children were then tested and those with IQs of 140 and over were retained (and a few in the 130s). Thus the study obtained 661 bright children, the top half of the highest one percent of the school population. Later the investigators added 365 more to obtain "the thousand." Still later others were added for special reasons, making the total group of gifted children 1,528.

Information was obtained about these children's home life and their school life. They were given medical examinations; anthropological measurements were made on them; school-achievement tests and character tests were given them; their interests, the books they had read, and the games they knew were inventoried. Here was a picture of the whole child, as well as it could be obtained. The description was published in *Genetic Studies of Genius,* I, *Mental and Physical Traits of a Thousand Gifted Children,* in 1925, with Terman as author and fourteen assistants, some of them later to be distinguished psychologists, listed on the title page.

The second volume of the Studies was, in a sense, a control for the first. It was called *The Early Mental Traits of Three Hundred Geniuses,* appeared in 1926 (a year after the first volume), was authored by Catherine M. Cox (now Miles) with Terman as one of her assistants, and consisted of 842 pages of analysis of the youth and young manhood of three hundred persons who had attained great distinction because of ability. The biographical facts were studied and an IQ estimated for childhood and another for youth. A measure of reliability was computed, dependent upon the nature and amount of data available for appraisal. These posthumous IQs for history's great were naturally of much comparative interest—Goethe with an estimated IQ of 210, Descartes at 180, Darwin at 165, and the child who became Napoleon at 145, just barely gifted enough for Terman to add to his group. The real purpose of the control was, however, to compare the childhoods of history's geniuses, with especial reference to their IQ performances, with the IQ performances of California's child "geniuses," that is to say, of the children with IQs of 140 or more. There was every evidence that history's great were bright as children and that their intellectual performance in childhood fell within the range of Terman's gifted children. The highest IQs, for both groups, were in the neighborhood of 200.

The third and fourth volumes of the *Studies* were follow-ups. The first resurvey occurred in 1927–28, six years after the initial one. It was published in 1930 under the title *The Promise of Youth* and under the joint authorship of Barbara S. Burks, Dortha W. Jensen, and Terman. Then there were resurveys in 1936, 1940, and 1945. The results of these came out in the fourth volume of the series. *The Gifted Child Grows Up,* by Terman and Melita H. Oden, published in 1947, about twenty-five years after the first study and when the gifted group averaged about thirty-five years of age. Terman retired to become emeritus in 1942, but he kept on at work without interruption. He was in constant correspondence with his gifted "children," as he still liked to call them, and a fifth volume with Mrs. Oden was under way when he died in 1956. She will continue the

work. It will show the "gifted group" thirty-five years after the genetic studies began, at about age forty-five. *The Gifted Child at Mid-Life* will round out the enterprise.

The general conclusion as of 1947 was that the gifted group continued to have superior physique and health. Their achievement quotients remained through school as high as their IQs. They tended to be versatile, not specialized. In school these children had nearly always been placed in classes above their age but below their capacity. They were not more subject to personal maladjustment than normal children, and that statement holds for the very high IQs above 170 as well as for those between 140 and 170. Vocational achievement rates were high among the group. Marital happiness was normal or a little above normal. Aptitude for marital success was good. There was some little regression of ability toward mediocrity, but only such as should be expected on statistical grounds. The fertility rate at that time was not sufficient to maintain the stock. Many marks of eminence were discovered among the men, and some among the career-minded women.

It is nevertheless clear that a high IQ, though maintained into adulthood, is not a sufficient cause for eminence. Sir Francis Galton believed that genius would emerge even against unfavorable conditions. The truth seems to be that it may not emerge as eminence, even under otherwise favorable conditions, when motivation is lacking. Intelligence alone is not enough. Ambition, career-mindedness, drive may also be necessary to obtain from men and women of ability the maximal contribution to civilization.

Terman suggested that capacity for contentment is also great among gifted persons and that this kind of success must not be overlooked, especially when one is examining the lives of able women who marry. Here lies what must at first have been an unforeseen development in these genetic studies of genius. It is not enough to be able to discover genius by measuring ability and selecting the top persons. Given the material for achievement, it has nevertheless to be energized. There can be, moreover, two kinds of success: society's

success that comes through the discontent that drives men of great ability to great achievement and the eminence that marks it, and the individual's success which gives him—or her—the contentment which would make him wish to live the same life over again if he had the choice but does not drive him to notable public accomplishment.

It is clear that these studies represent the taxonomy of genius. Terman's forte was description. It was not a simple naturalist's description. He used statistics to reveal hidden attributes. He was persistently ingenious in thinking up ways to measure new dimensions of ability, inventing tests and scales to support the big descriptive task. These books are crammed full of carefully related facts, systematized and put in order. There is, however, in them very little theory that is more than description, little desire to gain simplicity by the creation of conceptual entities. The exception is *intelligence*. To that reified construct Terman held vigorously. It was something that could be measured. The different tests might not wholly agree, but it was the tests that were at fault, he thought, as they got differently at the basic thing. Intelligence as a potentiality seemed pretty well fixed in childhood, and probably it was for the most part inherited. That is the way it seemed.

When factor analysis tended to split up "intelligence" into a number of primary abilities, Terman resisted the new thinking. He had too great an investment in intelligence to let it go readily. In the Second World War, however, intelligence tests by that name were abandoned, and the Army General Classification Test was used to measure three of Thurstone's seven primary abilities: verbal ability, numerical ability, and the comprehension of spatial relations. When this biographer remarked in 1955 that the concept of intelligence was on the way out, Terman protested; yet that was also the year of his marginal note about his being less sure than ever that intelligence (at least as the tests test it for Negroes and whites) is inherited.

Along with the scientific study of gifted children goes Terman's great practical achievement, the Stanford Achievement Test, a test

for mastery of school subject matter at every school grade from the second to the tenth. The original work was done in collaboration with T. L. Kelley and G. M. Ruch and was put on the market in 1923. As school curricula changed the test was revised in 1929, 1940, and 1953. It has four different forms, which show a very high correlation one with another. The standardization is now based on the performance of 345,736 school children drawn from 363 school systems in 38 states. It is the best-known of Terman's tests. Millions of school children have taken them. It would seem that Terman's feeling of financial insecurity disappeared as this test succeeded in the early 1920s, and it is not without interest to note that his drive for achievement did not diminish, so far as a biographer can tell, with the arrival of economic security for him. If compensation for frustration started the drive in youth—and that theory cannot be proved—then ambition must have continued from habituation or, as the psychologists sometimes say, by "functional autonomy."

In the 1930s, when he was about sixty and the gifted children were being allowed to do some growing up, Terman was responsible for three other important books.

In 1937, with Maud A. Merrill and after ten years of work, he revised the Stanford Revision of the Binet-Simon scale of intelligence, the 1916 job, publishing the result under the title, *Measuring Intelligence.* They improved the tests greatly, brought the lower level down to the mental age of two years, adjusted the tests at three levels for superior adults, arranged the IQ ratings for adults (the highest IQ obtainable is 152), and made out two equivalent forms of the scale (124 items each) to permit retesting. Later this improved test became available for testing the offspring of the "gifted children" now grown up.

MASCULINITY AND FEMININITY; MARITAL HAPPINESS

While work on the Terman-and-Merrill revision of the Stanford scale was in progress, Terman and Catherine Cox Miles, with nine other assistants, were working on a scale for measuring masculinity

and femininity. The result was the publication in 1936 of *Sex and Personality: Studies in Masculinity and Femininity*. This project had also occupied about ten years of work. The scale, as it was finally established, consisted of two equivalent forms of 455 items each, which sought to elicit characteristic masculine and feminine interests and attitudes by way of word associations, associations for ink-blots, knowledge and information, emotional and ethical responses, interests, opinions, and position in the extrovert-introvert continuum. The scale ran from +200 at the masculine extreme to −200 at the feminine extreme. The mean male was found to rate at +52 and the mean female at −70. The means were far apart, but the spread between extreme cases was enormous; nevertheless, the overlap between the two sexes was small (only about 8%). About 1,500 subjects contributed to this study.

The results are characteristic of all of Terman's work, a mass of facts with no simple general theory emerging—a Stanley Hall kind of study, one might almost say. So you find that masculinity—as measured by the scale—increased in males up to the eleventh grade (+70 on the average) and then diminished steadily until old age (0 at age eighty), whereas femininity in females diminished up to the college sophomore level (−60) and then increased a little (to −90 at ages sixty to eighty). The least masculine male group is the old men of all occupations, and the least masculine male group at younger ages is the clergymen, who were still less feminine than the most masculine female group, the women college athletes. (There was one extreme group of women athletes as masculine as the clergymen.) And so on, as education, intelligence, occupation, and interests affect the score on the scale for each sex. There was a special study of homosexuality and another of delinquent girls.

One reviewer of this book remarked that the research "borders perilously on a laborious demonstration of the obvious," but that remark is hardly fair. The quantification was new, the ability to say when there was overlap between the sexes and how much was new, the facts about age in the two sexes were largely new, and some of

the findings about homosexuality and about delinquent girls were unexpected. On the other hand, Terman found himself unable to come to a sure conclusion about the basic question as to whether psychological sex differences are due to nature or to nurture. He attacked Margaret Mead's case favoring environmentalism as unproven; he showed his prejudice for hereditarianism here as he had with intelligence; but the data were inappropriate for a decision.

Terman's third report of research in book form in the 1930s was his *Psychological Factors in Marital Happiness,* written with the assistance of four others, published in 1938. It was a survey of the hedonic state of 792 married couples and 109 divorced couples, 1,802 persons altogether. The data consisted in the results of personality tests and the responses to questions. The work led to the establishment of a scale of happiness, which had, as it turned out, a skew toward the more cheery extreme. On this scale it was possible to get scores of happiness and to relate them statistically to various supposed contributors to marital happiness.

What turned out was worth getting. Most of the supposed causes of marital happiness and unhappiness were not valid. Sexual relations mattered much less than had been anticipated. So did differences in age and in education between the spouses. The general conclusion could have been that happy persons make happy pairs. If one goes behind this truism, looking for causes, one can say that happy marriages depend most upon the superior happiness of the couples' parents, on the childhood happiness of the couples themselves, on the strength of attachment to mothers and fathers, and on the infrequency and mildness of childhood punishment.

This was all important information, but it must have fallen short of what Terman had hoped for. Description is not engineering, and you cannot in practice retrieve an unhappy marriage by finding happy parents for each of the unhappy couples. Nor is there yet apparent any good advice for the unhappy, as to whether they should stay unhappily unmarried or become unhappily married. There is this to say, though: An unhappy man or woman may have a happy

spouse. The hedonic gift is not dispensed in pairs, and the blame and credit assessed to marriage are perhaps more often a rationalization than a true statement of cause.

Terman, the avid constructer of mental tests, discovered, presumably to his initial surprise, that tests have a commercial value. The poor farm boy, the twelfth of fourteen children, who borrowed money to go to the Central Normal College, to Indiana University, and then to Clark University, who came away from Clark $2,500 in debt and went to poorly paid teaching positions in San Bernardino and Los Angeles—twelve years of relative poverty with a wife and, later, two children—this boy, who became a professor at Stanford University, the author of the Stanford Revision of the Binet-Simon Tests of Intelligence, and, a little later, of the lucrative Stanford Achievement Test, discovered that the royalties on the tests were no inconsiderable sum when judged by academic standards. Terman's tastes were never extravagant. He continued to lead the life of a somewhat frail academic, but he could not have needed to worry about money after the Stanford Revision became the standard test of intelligence—one might almost say, had become the operational definition of intelligence—throughout the United States. He lived to see America become test-conscious. That he profited from the sale of the tests is incidental. We have already noted that his indefatigability was not diminished by his acquisition of an adequate income.

PERSPECTIVE

In 1956 it became the responsibility of the committee of the American Psychological Foundation to decide upon its second annual Gold Medal Award, the award for 1957, "to be given to an American psychologist with a distinguished and protracted history of scientific and scholarly accomplishment." The first Gold Medalist had been Robert S. Woodworth. The committee chose as the second Lewis Terman, but they were not quite in time. Terman died on December 21, 1956, and the award was not to be made until September 2,

1957, at the annual meeting of the American Psychological Association. The committee decided that posthumous awards are not desirable. They announced their intention, and honored Terman by finding for him no substitute, while the assembled members of the Association concurred by remaining silent for a brief interval.

Now let us try to obtain a perspective on the life of this leader of American psychology. Lewis Terman's outstanding characteristics were his drive and his love of learning. It is possible to interpret the drive as compensation for frustration, as original effort to transcend the limitations of a farmer's life, transformed by maturation into the personality pattern of an ambitious adult. That appeal to the environmentalistic explanation, however plausible, must remain speculative. Terman himself would have looked to heredity for his causation, yet there is no evidence that he was duplicating the pattern of his ancestors or his siblings, even though his son, with a very different youth, has also achieved academic eminence.

It is better, then, to take Terman as a fact, to content ourselves with describing how in fact he did escape from a farmer's life, not because he hated the life—he did not—but because he wanted learning more.

He was a farmer's boy, one of fourteen children. His father owned a few score of books, but there could be no luxuries in that home. He read the books, any book he could get hold of, and determined if possible to acquire an education. In that community the way out of farm life to education was by teaching school. So Lewis Terman took that route.

One sees in his unquenchable avidity for reading and schooling how strong his drive was. He would get through school, and still go on. His parents helped him at first when they could, but that was not much. At each new level he could see the one beyond. At Central Normal College he wanted Indiana University. There, in contact with Bryan, Lindley, and Bergström, he wanted Clark. At Clark the next pattern was set by Stanley Hall. His progress was, however, checked by the emergence of tuberculosis. What happened? Cer-

tainly this frustration intensified his determination. He accepted the geographical limitations of climate, but his ambition remained undiminished. San Bernardino was a step to Los Angeles. Always, when the tuberculosis checked him, he refused to surrender, took the minimal means for restoration, and was soon back on the job.

From Los Angeles he went to Stanford. Big ideas were occupying his mind. The revision of the Binet tests was his first big undertaking, and it was successful.

At first he had accepted his isolation as an educationalist, according to the pattern of Stanley Hall, but then he perceived the next level, the new world of scientific psychology, which he had known about at Clark and now was anxious to join. Teaching in the east in the summers, joining the American Psychological Association, being thrown by the psychological work of the First World War into contact with the other psychologists of the country, the growing success of the tests—all these things, plus the financial security that now at last came to him, gave him confidence in his own worth and importance. They gave him confidence, these things, but they did not release the tensions that drove him on.

For twenty years at Stanford as Executive Head of the Department of psychology, and for fifteen more as an active emeritus, he kept on enthusiastically with the lines of endeavor he had started. The second revision of the Binet tests, the Stanford Achievement Test, the measure of masculinity-femininity, the scale of marital happiness were efforts along the way, efforts that showed what tests could do and also how they might be found limited, but his main understanding was the *Genetic Studies of Genus,* his work with his "gifted children," with whom he was in correspondence thirty-five years after the work began, an affectionate father figure, as he wanted to be and as many of the "children" regarded him. He kept writing to the "children," and their spouses, asking about the "children's" children and their lives; and they, accepting him as a father figure, replied and gave throughout the years many hours of their time in tests and questionnaires for both themselves and their children.

Terman himself liked to speculate on what would have happened to him if he had not gone to Indiana and met Lindley, if he had chosen Florida instead of California, if the death of Bergström had not led to his being called to Stanford. Such guessing is futile. There are no controls for history, and you cannot state general biographical laws. You can, however, describe what happened, and it is clear that Terman and the times were able to fit each other. Terman was inept with apparatus just when American psychology was becoming brass-instrument conscious, but he found Stanley Hall, an erudite entrepreneur of the mind who was not an apparatus man. Terman fitted the Hall pattern and all his life reflected something of what he learned in Hall's famous vitalizing seminar. Terman wanted to get to the top and did, the top of the particular mountain on which he was.

Lewis Terman was a friendly person. He liked people and wanted them to like him. To avoid a vigorous social life he pled habitually his physical frailty, for the tuberculosis had convinced him that he was not physically strong; yet he needed to be liked, he wanted love and affection from many, and his immediate colleagues and the others at a distance warmed to his eager friendliness. Like the gifted children the graduate students too thought of him as a father figure—especially those who attended his Stanley Hall-like seminar, held like Hall's own on a Monday evening, and those few who came beforehand to dinner, where Mrs. Terman always played the gracious hostess.

This need for friendly relations with his associates is consistent with Terman's liberal political philosophy. He believed intensely in freedom of teaching and freedom of thought, in the democratic process, and to some extent in the socialization of education and medicine. He wanted social justice, racial tolerance, equality of opportunity. He believed that the social sciences should set themselves to the task of civilizing man's impulses and emotions so as to make it possible for mankind "to live together in peace, justice and good

will." [12] This is a philosophy wholly consistent with the reactions of the isolated farm boy who urgently sought success and friends among scientists and scholars.

Some persons, noting that he tended to believe in an hereditary intellectual élite, wonder how such an undemocratic view could be held by this tender-minded, sensitive, ambitious person, but the fact is that Terman thought of the intellectually élite as those who would save civilization for democracy. The gifted were given. You do not choose to have them, for there they are, whether you will or no. You can, however, choose to use them, to separate them from the crowd so that they may be trained to devote their special talents to benefit the crowd from which they have been taken.

That, then, is Lewis Terman, a sensitive man who wished to succeed and was strengthened by difficulty, as able a man as Stanley Hall's seminar ever provided among the many able men that it produced, a widely read man who loved knowledge for its own sake, a clear and felicitous writer with a gift for the popular account that left the scientific values intact, a friendly chap determined to have affection and yet to keep pushing toward the top, the dean of America's premathematical mental testers, a democratic liberal who believed that the intellectual élite, since they are a fact, must be used to promote a peaceful civilization in which new knowledge forever advances the human weal. In addition to his many contributions to modern scientific psychology, this practical demonstration in social philosophy may also in the future come to stand out as of great importance: Lewis Terman, a liberal in his thinking, showed, nevertheless, how democracy cannot avoid stratification as it is given by nature's inevitable division of human material into different levels of ability.

[12] On Terman's philosophy of life, see Hilgard's biography, pp. 478f.

KEY TO ABBREVIATIONS

Amer. J. Psychol.=American Journal of Psychology
Amer. Phil. Soc. Yearb.=American Philosophical Society Year Book
Amer. Psychologist=American Psychologist
Amer. Sociol. Rev.=American Sociological Review
Calif. Med.=California Medicine
Calif. Outlook=California Outlook
Charact. Pers.=Character and Personality
Commercial Law J.=Commercial Law Journal
Contemp. Psychol.=Contemporary Psychology
Dietetic Hyg. Gaz.=Dietetic and Hygienic Gazette
Educ. Forum=Educational Forum
Educ. Psychol. Monogr.=Educational Psychology Monographs
Educator-J.=Educator-Journal
Genet. Psychol. Monogr.=Genetic Psychology Monographs
Harp. Wkly.=Harper's Weekly
Indep. Educ.=Independent Education
Indiana Univ. Alumni Quart.=Indiana University Alumni Quarterly
J. Abnorm. Psychol.=Journal of Abnormal Psychology
J. Appl. Psychol.=Journal of Applied Psychology
J. Crim. Law Criminol.=Journal of Criminal Law and Criminology
J. Delin.=Journal of Delinquency
J. Educ. Psychol.=Journal of Educational Psychology
J. Educ. Res.=Journal of Educational Research
J. Educ. Sociol.=Journal of Educational Sociology
J. Except. Child.=Journal of Exceptional Children
J. Higher Educ.=Journal of Higher Education
J. Personnel Res.=Journal of Personnel Research
J. Phil.=Journal of Philosophy
J. Psycho-Asthen.=Journal of Psycho-Asthenics
J. Psychol.=Journal of Psychology
J. Soc. Psychol.=Journal of Social Psychology
J. Tchr. Educ.=Journal of Teacher Education
Los Angeles Bar Assn. Bull.=Los Angeles Bar Association Bulletin
Marriage Fam. Liv.=Marriage and Family Living
Mem. Nat. Acad. Sci.=Memoirs of the National Academy of Sciences
Mother's Mag.=Mother's Magazine
Nat. Educ. Assn.=National Education Association
Nat. Educ. Assn. J.=National Education Association Journal
Nat. Educ. Assn. Proc.=National Education Association Proceedings
Nat. Soc. Stud. Educ.=National Society for the Study of Education
New Eng. Mag.=New England Magazine

New Repub. = New Republic
N. Y. Times = New York Times
N. Amer. Rev. = North American Review
Occup. = Occupations
Pac. Hist. Rev. = Pacific Historical Review
Ped. Sem. = Pedagogical Seminary
Pop. Sci. Mo. = Popular Science Monthly
Psychol. Bull. = Psychological Bulletin
Psychol. Clin. = Psychological Clinic
Psychol. Monogr. = Psychological Monographs
Psychol. Rev. = Psychological Review
Riverside Educ. Monogr. = Riverside Educational Monographs
S. F. Call = San Francisco Call
Sch. Rev. = School Review
Sch. Soc. = School and Society
Sci. Amer. = Scientific American
Sci. Mo. = Scientific Monthly
Scribner's Mag. = Scribner's Magazine
Sierra Educ. News = Sierra Educational News
Soc. Sci. Res. Conf. = Social Science Research Conference
Soc. Serv. Rev. = Social Service Review
Sociol. Soc. Res. = Sociology and Social Research
Stanford Illus. Rev. = Stanford Illustrated Review
Train. Sch. Bull. = Training School Bulletin
Univ. Calif. Chron. = University of California Chronicle
Wash. Educ. J. = Washington Education Journal
Yearb. Nat. Soc. Stud. Educ. = Yearbook of the National Society for the Study of Education
Z. päd. Psychol. = Zeitschrift für pädagogische Psychologie

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