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Julian C. Stanley

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The author is a professor of psychology and Director of the Study of Mathematically Precocious Youth at The Johns Hopkins University, Baltimore, Maryland. After completing his doctorate in educational psychology and measurement at Harvard University, he went in 1949 to teach at the George Peabody College for Teachers and (part-time) Vanderbilt University. In 1953 he moved to the University of Wisconsin, where he helped found a department of psychology and was its first chairman. Also, he started the Laboratory of Experimental Design at Wisconsin. In 1967 he moved to Johns Hopkins.

Dr. Stanley is a past president of the Divisions of Educational Psychology and of Evaluation and Measurement of the American Psychological Association, of the American Educational Research Association, and of the National Council on Measurement in Education. He is a Fellow of six divisions of the American Psychological Association, of the American Association for the Advancement of Science, and of the American Statistical Association.

He is the author, coauthor, or editor of 10 books and of approximately 275 chapters, articles, reviews, and research notes.



Professor Julian C. Stanley, left, counsels Eugene W. Stark, a 16 year old junior majoring in electrical engineering at the Johns Hopkins University.

CONCERN FOR INTELLECTUALLY TALENTED YOUTHS: HOW IT ORIGINATED AND FLUCTUATED

Julian C. Stanley

Even back into prehistory perceptive parents, relatives, and friends seem to have recognized great talents that might help the group in practical or aesthetic ways. The fledgling hunter who showed unusual skill, the youth whose drawings in the cave evoked admiration, and the apprentice shaman with great aptitude for magical rites were likely to find pursuit of their particular *métier* (in the sense of a "calling") encouraged. Often they were relieved of certain other responsibilities and given special training.

Before the days of compulsory education it was common for youths to be tutored initially in a variety of subjects, often by scholars now renowned in history. Those few who showed a flair for a particular area such as mathematics or languages might get further stimulation and pacing. Of course, children whose parents were wealthy participated far more in this type of one-to-one schooling than did most of the less affluent. There were, however, quite a few patrons whose impecunious protégés received splendid, prolonged assistance. Illustrations of such situations are contained in many books, e.g., Bell (1937), Cox (1926), Hesse (1906), Packe (1954), Schonberg (1970), and Wiener (1953).

One reads about how the nine-year-old Felix Mendelssohn conducted his own compositions with an orchestra hired by his parents expressly for that purpose. From John Stuart Mill's very early days his father was his chief tutor, but John also benefited enormously from associating with his father's friends such as the renowned Jeremy Bentham. Princely patronage of prodigies was not uncommon in Western Europe during the eighteenth and nineteenth centuries, but of course most talent was lost for lack of a sponsor.

Thus, long before the advent of formal tests those children whose obvious talents were prized sufficiently by someone might have them developed more or less systematically. Brilliant tutors were widely available at modest rates, and for the most part supervising the education of a child was his or her parents' responsibility. Emergence of virtually free but compulsory education changed the focus by making training in school the responsibility of the state or church. Devising of measurement and appraisal instruments for identifying talented youths made talented students more apparent, but from the start these tools reposed mainly in nonparental

hands such as school testing bureaus and clinics. Those two themes, compulsory education outside the home and the emergence of structured identification procedures, permeate the history of the "gifted and/or talented child movement." It should repay us to see how they interrelate.

Hereditary Genius

In the United States massive efforts to provide instruction in the three R's and beyond for all children who could benefit from schooling date strongly from the efforts of an educator in Massachusetts, Horace Mann, during the middle of the nineteenth century. This almost parallels in time the work of Francis Galton in England that in 1869 culminated in his book entitled *Hereditary Genius: An Inquiry into its Laws and Consequences*. His preface sets the stage for detailed genealogical studies:

The idea of investigating the subject of hereditary genius occurred to me during the course of a purely technological inquiry, into the mental peculiarities of different races; when the fact, that characteristics cling to families, was so frequently forced on my notice as to induce me to pay especial attention to that branch of the subject. I began by thinking over the dispositions and achievements of my contemporaries at school, at college, and in after life, and was surprised to find how frequently ability seemed to go by descent. Then I made a cursory examination into the kindred of about four hundred illustrious men of all periods of history, and the results were such, in my own opinion, as completely to establish the theory that genius was hereditary, under limitations that required to be investigated. Therefore I set to work to gather a large amount of carefully selected biographical data, and in the meanwhile wrote two articles on the subject, which appeared in [1965]. I also attacked the subject from many different sides and sometimes with very minute inquiries, because it was long before the methods I finally adopted were matured. I mention all this, to show that the foundation of my theories is broader than appears in the book . . . The theory of hereditary genius, though usually scouted, has been advocated by a few writers in past

as well as in modern times. But I may claim to be the first to treat the subject in a statistical manner, to arrive at numerical results, and to introduce the "law of deviation from an average" into discussions on heredity.

Galton thought of talent comprehensively. His book contains chapters about judges, statesmen, military men, literary men, men of science, poets, musicians, painters, devines, senior classics of Cambridge, oarsmen, and wrestlers of the North Country. They are preceded by classification schemes and followed by analyses. Though many modern social scientists believe that Galton greatly undervalued environmental influences, his careful scholarship and thoroughness influenced the thinking of many important persons throughout the world. *Hereditary Genius* became a classic that is even yet essential reading for all persons seriously interested in the identification, study, and nurturing of talented youths.

Intelligence, Tests, Mental Ages, and IQ's

In 1905 there burst upon the educational and psychological community the first so-called intelligence test that provided the differentiation among young students in educational aptitude that Cattell (1890) had called for 15 years earlier. Its authors, French psychologists Alfred Binet and Theodore Simon, entitled their first article about the test "Méthodes nouvelles pour le diagnostic du niveau intellectuel des anormaux." They did indeed propose radically new methods for ascertaining the intellectual level of slow-learning pupils in the lower school grades. In 1908 Binet and Simon arranged the items as an age scale so that scoring was in terms of months of mental age. In 1911 Binet published another article about his test; he died that year.

Binet's method fell upon fertile empirical soil in the United States and flourished vastly beyond anything that brilliant researcher must have anticipated. By 1910 Henry Goddard, a psychologist doing research at The Training School for mental retardates in Vineland, New Jersey, had published an article entitled "Four hundred feebleminded children classified by the Binet method." A year later there appeared his "Two thousand normal children measured by the Binet measuring scale of intelligence." This article marked the transition from use of intelligence tests with slow learners to applying them also to average and above-average persons.

It remained for a psychologist at Stanford University, Lewis M. Terman, to adapt and standardize the Binet-type scale for use with a wide range of ability. For 21 years the Stanford Revision of the Binet-Simon Intelligence Scales (Terman, 1916) was the standard for ascertaining the mental age and IQ of persons as young as two years of age or so and as old as one cared to test. Terman superseded it in 1937 with his Stanford-Binet Intelligence Test. (Also see McNemar, 1942.) Further changes were made in 1960 and 1972. To this day it is the criterion against which all other single-IQ intelligence tests are judged.¹

Systematic Study of "Gifted" Children Begins

Terman was an admirer — virtually a disciple — of Galton. Terman's first three articles, one of them written while he was still an undergraduate, concerned the talented: "A preliminary study in the psychology and pedagogy of leadership" (1904), "A study in precocity and prematuration" (1905), and "Genius and stupidity: A study of seven 'bright' and seven 'stupid boys'" (1906, based on his thesis for the Ph.D. degree). It was natural, then, that having at hand his own intelligence test and his own concept of learning rate (the IQ) he should initiate a longitudinal study of children whose Stanford-Binet IQ's were high. This began in 1921 and continues until the

present day. The initial report about the 1528 children who were identified as having IQ's of at least 135, and in most instances not less than 140 and therefore ranking in the upper one in 100 or 200 of the age group, appeared in 1925, only a little more than half a century ago. Entitled "Mental and Physical Traits of a Thousand Gifted Children," it was Volume I of Terman's *Genetic Studies of Genius series*.²

As he expected, Terman found that most prejudices about persons who as children had scored high on intelligence tests were unfounded. Such individuals did not tend to be small or unhealthy, "peter out," "burn out," die young, decline in intelligence, or fail as adults. On the contrary, they tended to excel in nearly all positively valued characteristics. Oden (1968, p. 51) sums up the evidence as of 1960, when the mean age of the followed group was 50: ". . . after 40 years of careful investigation there can be no doubt that for the overwhelming majority of subjects the promise of youth has been more than fulfilled. The Terman study has shown that the great majority of gifted children do indeed live up to their abilities." That is what Terman wanted to prove. His study was descriptive and observational, not intentionally interventional; he did not attempt to improve the education of the gifted except by trying to modify the attitudes of most adults toward extremely bright youths.

If Galton was the grandfather of the gifted-child movement and Binet its mid-wife, Terman must qualify as the father. Working around the same time was an ardent, indefatigable advocate of better educational treatment for gifted students, Leta S. Hollingworth, who had been born in a sod hut on the Midwestern prairie. She was active at Teachers College of Columbia University until her death in 1939 at age 53 (see H. Hollingworth, 1943), whereas Terman was busy on the other coast and nationally until far beyond his retirement in 1942. Hollingworth may be considered the nurturant mother of the movement, through her personal efforts in the New York City area and especially via her two books (L. Hollingworth, 1926 and 1942). Yet, strangely, she and Terman seem to have had little or no contact with each other; in doing research for her interesting biography of Terman, Seago (1975) did not find any correspondence between Terman and Leta Hollingworth.³

Others Help Found the "Movement"

Galton, Binet, Terman, and Leta Hollingworth set the stage for what came to be called the "gifted-child movement." Some theoretical underpinning was provided by the British measurement theorist Charles Spearman (1927), the great educational psychologist Edward L. Thorndike (1926), and the prime developer of psychometrics, Louis L. Thurstone (1938). An alternative approach to Terman's adaptation of the Binet-Simon scales came from a clinical psychologist, David Wechsler (1939), who developed point (rather than age) subtests to ascertain performance IQ separately from verbal IQ.

Perhaps most influential of all has been the extensive use of the College Entrance Examination Board's Scholastic Aptitude Test for admission to colleges throughout the United States and even parts of Latin America. This group test consisting of multiple-choice items was developed by experimental psychologist Carl Campbell Brigham in 1926 (see Downey, 1961). It measures two aspects of developed intellectual functioning, mathematical reasoning ability and verbal reasoning ability. While these are by no means independent, the distinction has proved useful for predicting academic success in college.

²Thus far there have been five volumes in that series and a subsequent monograph. The relevant references are Terman (1925), Cox (1926), Burks, Jensen, and Terman (1930), Terman and Oden (1925, 1959), and Oden (1968). Also see Sears and Barbee (in press) and Sears (in press).

³Personal communication from Dr. May V. Seago, April 24, 1976.

¹For further information about the history of intelligence testing, see Goodenough (1949).

Besides the methodologists, whose contributions were not directed specifically toward great intellectual abilities, many researchers and educators tried to study gifted children further and in some instances to help them educationally. Among the most active of these were Pressey (1949), Witty (1930), Havighurst (e.g., DeHaan & Havighurst, 1957), persons at the University of Chicago (see Bloom, Allison, & Diederich, 1950), Worcester (1956), Hobson (1963), and the Fund for the Advancement of Education (1953, 1957).

Many educationally accelerative procedures were tried, such as entering kindergarten or the first grade early, skipping grades, moving ahead faster in a particular subject area, combining grades, and entering college early. Acceleration was soon countered with "enriching" procedures such as special schools or classes or "streams" for the gifted or talented and a variety of supplemental activities inside or outside class. (For a classification of enrichment, see Stanley, 1976.) Though research consistently shows acceleration to be beneficial, most educators consider it detrimental to the social and emotional development of school children. No amount of objective evidence seems to make a dent in this prejudice, which is often entwined with a superficial democratic ethic that demands the same curricular treatment for all children except obviously slow learners.

The Post-Terman Era

When Terman died in 1956 (see Sears 1957), most systematic concern for the intellectually gifted seemed to erode. Three influences about that time hastened the demise of the movement. One was the concern generated when Russia launched the first sputnik (artificial space satellite). This led to a number of special curricula in mathematics and science for use in secondary schools. Among these were the familiar School Mathematics Study Group (SMSG) mathematics, Physical Science Study Committee (PSSC) physics, and Biological Sciences Curriculum Study (BSCS) biology programs. These were attempts to "beef-up" those subjects in order to provide better bases for later study and, to a lesser extent, better fundamental understanding of mathematics and science by the layman. Substantial elements of these curricula have entered current textbooks and teaching methods. There have been reactions to what some viewed as excessive abstractness, culminating in partial return to the "fundamentals" and an occasional competing program such as Harvard's Project Physics that is meant to be more practical and interesting than the sputnik-inspired originals.

These new programs were devised for class consumption and therefore were geared not to the very ablest students, but instead to the considerably above average ones. They did not meet the needs of the most gifted well, and they helped to turn attention away from Terman's lovingly studied upper one-half of 1 percent.

Two other influences, however, seem to have been more potent. One was the 1954 Supreme Court ruling that led to the current stress on compensatory education of culturally disadvantaged minority groups such as Blacks, Mexican-Americans, Puerto Ricans, and American Indians. Although this new emphasis was salutary and long overdue, it turned out to be another shove into the coffin for concern about the intellectually gifted, except as they are found in these groups.

Around 1957 Congress became concerned about mental retardation and began giving what were by the standards of that time large amounts of money to study and ameliorate it. In fact, the first budget of the Cooperative Research Branch of the U.S. Office of Education consisted of two-thirds of a million dollars, all of which was earmarked for research in mental retardation.

The federal and state dearth of monies with which to help highly gifted children continues to the present day. Although there is now a federal office for the gifted — located in the U.S.

Office of Education's Bureau of the Handicapped — little money is available yet for studying or aiding the upper 1 to 5 percent of school children more than will occur in their regular classes. Even active city or county or state school system specialists in the gifted are rather rare. Most concern, if it exists at all, is vested in the director of special education, and one has only to glance at such professional publications as *Exceptional Children* or the *Journal of Special Education* to see how much they are devoted to cultural disadvantage and mental retardation and how little explicitly to high ability children. The only standard national journal exclusively about gifted and talented persons is the *Gifted Child Quarterly*.

Various influences, especially some of the above, have produced a wave of egalitarianism that brands as elitist most special provisions for the gifted, that eliminates or dilutes most special schools and curricula for them, and that attacks mental testing itself and urges a return to pre-Binet subjectivism. This is another example of an attempt to throw away the baby along with the dirty bath water. IQ scores have been misused a great deal. Some uninformed persons have considered them immutable, entirely based on heredity, and infallible predictors of success in school and life. The nature versus nurture controversy rages again. Perhaps Terman preached a little too much of Galton's doctrine and thus inadvertently helped plant the seeds for the neglect of the gifted.

Also, Terman did not produce disciples to continue his work well. He chose to use chiefly highly able, mature research assistants rather than unusually bright young graduate students specializing in the area of the gifted. Only four of the 27 doctoral dissertations for which he was the major professor dealt with intellectually superior persons (Seagoe, 1975, pp. 205-210). Thus he did not insure continuity of his main efforts via successors, nor was Leta Hollingworth successful in this respect, either.

The Present, and Prospects for the Future

Though intellectually talented youths remain a vastly undervalued national and personal resource, particularly by many educators, there are signs of revived interest in them that is somewhat reminiscent of the surge during the 1920's and 1930's. Far better tools for identifying and studying brilliant children are now available, and a solid body of results from many studies can guide educational practice. Though still considered an ogre by the typical teacher or school administrator (and by many brainwashed parents), educational acceleration is proving to be the method of choice for certain intellectually talented students. Foremost among these are youths who reason extremely well mathematically and are eager to move ahead in school-grade or subject-matter placement, rather than putting up with the usual age-in-grade lockstep. By no means all mathematically talented pupils want their school progress accelerated even a little, but when given free choice quite a few accept that option.

In 1971 the writer began the Study of Mathematically Precocious Youth (SMPY) at The Johns Hopkins University. It was supported for the first five years by a sizable grant from the Spencer Foundation of Chicago. In expanded form the project continues with support from that foundation and three others. Emphasis from the beginning has been on finding boys and girls who as seventh or eighth graders reason better mathematically than the average male high-school senior does. The ablest of these, who reason mathematically at least as well as the typical Johns Hopkins freshman, are studied much further and helped in a smorgasbord of ways to move ahead faster and better in mathematics and related areas.

Results to date have been spectacular indeed. By the end of the summer of 1976 144 precollege youths had taken a total of 312 college courses (equivalent in amount to more than 7.5 bachelor's degrees) with an overall grade point average of 3.57,

where 4.00 would be straight A. Even though the searching for mathematical talent began mainly with seventh and eighth graders in March of 1972, already SMPY has seen 71 young men and women enter college at least one year, and as much as six years, early. A ten-year-old made the highest grade in a regular college computer-science course. A math prodigy will be graduated from an excellent college with nearly perfect grades two months after his 15th birthday. In the fall of 1973 he entered that college as a full-time student, having completed only the sixth grade of a public school, and earned a grade of "A" in third-semester college calculus.

In December of 1976 a young man is being graduated from Johns Hopkins at barely age 17 with a B.A. degree in mathematical sciences after only five semesters here, one year in senior high school, and one year in junior high school. When we first met him in October of 1971, only five years earlier, he was a sixth grader. His list of extracurricular activities is long, including a high-school letter in wrestling and a varsity spot for two years on the college golf team. He has already taken graduate seminars in political science and economics and graduate courses in physics.

In May of 1977 there will probably be two other 17-year-old graduates, each accelerated four years in grade placement, and three more graduates accelerated three years each.

I mention these startlingly radical accelerants mainly to indicate that being a year or two accelerated in grade placement by the end of college is not the stressful expedient for a brilliant youth that it is mistakenly supposed to be. Space does not permit saying much more about SMPY's other activities, such as the creation of special fast-math classes and the provision of highly able young "tutors" to work with mathematically talented students. More can be learned about SMPY's educationally accelerative smorgasbord by consulting the following books and articles: Stanley, Keating, and Fox (1974), Keating (1976), and Stanley (in press).

Fundamental reorganization of public educational systems in this country is needed in order to provide better for the wide range of individual differences in learning various school subjects. That seems unlikely to be forthcoming on a large scale within the foreseeable future, however, so it behooves educators to provide special programs at the low and the high ends of various continua of abilities. Considerably more orientation toward intellectual talents such as mathematical, verbal, nonverbal, and mechanical reasoning ability seems desirable in order to counteract the 60-year emphasis on the Binet-type global IQ. That measure of academic learning rate may be the best *single* index of brightness we have, but it does not predict achievement well enough within the various subject areas. For example, high score on the mathematical part of the Scholastic Aptitude Test (SAT-M) is more useful for homogeneous grouping in order to accelerate progress in mathematics than is high score on SAT-Verbal. Like an IQ, however, SAT-V scores are useful for helping decide which of the high scorers on SAT-M are likely to move well through a fast-paced special math course (see Fox, 1974, p. 114-116).

The above observation suggests that one might identify first on several abilities such as most of the eight measured by the Differential Aptitude Tests. Take the upper x% of scorers on each DAT test (verbal reasoning, numerical ability, abstract reasoning, mechanical reasoning, space relations, language usage, spelling, and clerical speed and accuracy). Then, if desired, do further testing of these high scorers to study their other abilities. Some such tests might yield IQ's. Others might simply be harder tests of the areas in which the particular students scored best—e.g., a more difficult test of mechanical reasoning for those who scored at or near the top of the DAT-MR score scale. Still others might assess interests, values, attitudes, and personality characteristics. Starting with tests of general intelligence will inevitably eliminate some students with special intellectual talents before those talents are known. Starting with tests of a variety of special talents makes it unlikely that one will overlook youths with high IQ's, but much more likely that the specially talented will also be found.

This tends to be a more democratic approach, because most of the special talents are probably less closely related to the socioeconomic level of the child's parents than is the Binet-type IQ or the Wechsler verbal IQ. For example, from SMPY'S data it is obvious that high scorers on SAT-V when age 12 or 13 tend to come more frequently from well-educated, affluent families than do high scorers of those ages on SAT-M.

Thus, after 70 years of development (dating roughly from Terman's doctoral dissertation) there is room for cautious optimism about the possibility of improving educational opportunities for the intellectually talented. Parents of such children are awakening to the magnitude of the need and the availability, in principle if not in practice, of cost-effective procedures for meeting that need. Groups of them are beginning to insist that schools make appropriate provisions for their highly able youngsters. Expensive curricular adjustments are, quite justifiably, considered essential for slow learners. It is past time that fast learners get the much less costly "special education" they deserve.

A well-known quotation from Thomas Gray's famous elegy sums up the case for seeking talent and nurturing it:

Full many a gem of purest ray serene,
The dark unfathom'd caves of ocean bear:
Full many a flower is born to blush unseen,
And waste its sweetness on the desert air.

Another poet (Browning) tells us that ". . . a man's reach should exceed his grasp, Or what's a heaven for?"

It is our responsibility and opportunity to help prevent the potential Miltons, Einsteins, and Wieners from coming to the "mute inglorious" ends Gray viewed in that country churchyard long ago. The problem has changed little, but the prospects are much better now. Surely we can greatly extend both the reach and the grasp of our brilliant youths, or what's an educational system for?

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Department of Psychology, The Johns Hopkins University, Baltimore, Md. 21218.

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Routh, Secretary-Treasurer Section I, Child Development Institute, University of North Carolina, Chapel Hill, N.C., 27514.

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