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Current Comments

Will a Bright Mind Make Its Own Way?

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Thanksgiving and Christmas can be happy occasions for those people fortunate enough to see family and children once again. But holidays can also be very sad, not only for those people who are alone but also for the many deprived children in the world. This deprivation may take the form of hunger and/or one of the many illnesses that afflict the young.

Ever since I was a child, there have been Christmas charity drives by organizations concerned with physical deprivations. But I've never seen an appeal for children who are intellectually deprived. While one can only applaud the work of UNICEF and other agencies concerned about the millions who have not yet learned to read or write, I wonder who is helping the thousands of "gifted" children everywhere who are trapped in an intellectual wasteland. So I'd like to dedicate this essay to those children everywhere who have the blessing of being gifted but exist in a world that can often be cruel just because they are gifted and, therefore, different. I don't think we can do too much for such children. While this essay shows that there is indeed considerable activity in support of gifted children, the effort is small compared to the magnitude of the problem.

I do not think it is elitist to single out such children for special attention. Social and health workers, parents, and others devote thousands of hours of love and attention to mentally retarded and other unfortunate children. Yet society does not make an equal investment in its geniuses. I suppose it is because so many people think the gifted will somehow manage. This is not always true. Sometimes gifted children commit suicide before they become adults.

The school system in which I grew up recognized those gifted children who did well in school. When I was at grammar school, I "skipped" a year even though I was already the shortest kid in the class. Eventually I went to one of the elite New York high schools to study science. But I dropped out of Stuyvesant after a year because I did not like my biology teacher and wanted to study languages. At DeWitt Clinton, however, I just coasted along until I graduated. Ironically this enabled me to acquire business skills like bookkeeping, mimeographing, and typing which I might not have acquired had I remained in a purely academic program.

I was reminded of this recently when my friend Joshua Lederberg, president, Rockefeller University, sent me an article about an unusual science laboratory established in the 1940s for gifted youngsters. Apparently, he and about 60 other teenage boys and girls attended this lab, located above the IBM showroom in New York, after school and on weekends. It was here that many had their first taste of independent scientific

research. Under the direction of Henry Platt, who is still involved in education of the talented, Lederberg, Baruch Blumberg, and other "junior scientists" conducted experiments on pretty much any project that interested them. They were given professional guidance and had access to equipment unheard of in standard science classrooms.[1]

Would Lederberg and Blumberg have become Nobel prizewinning scientists if they hadn't attended this student science lab? Possibly. But it is entirely conceivable they would not have become as enthusiastic about a scientific career had they not had this opportunity. Where else in New York in the 1940s could the children of immigrants experience the thrill of independent research or the intellectual stimulation provided by other equally talented youngsters?

Westinghouse Electric Corp. and IBM, who sponsored this science laboratory, were ahead of their time in encouraging what are now referred to as gifted children. These are children who, according to recent legislation entitled the "Gifted and Talented Children's Educaucation Act of 1978," possess "demonstrated or potential abilities that give evidence of high performance capability in areas such as intellectual, creative, specific academic, or leadership ability, or in the performing and visual arts, and who by reason thereof, require services or activities not ordinarily provided by the school."[2]

Why are these services for gifted children needed? C. Switzer and M.L. Nourse, Meridian Branch-Mississippi State University, believe it's because most schools "foster mediocrity." They write, "The child is bombarded with forces which encourage modification of behavior, creativity, and intellectual development toward the mean of the group."[3] Unless special provisions are made for the gifted child, his or her talents will probably be lost.

Leta S. Hollingworth, Teachers College, Columbia University, one of the earliest investigators of the gifted, found that some may even "...become contentious, aggressive, and stubborn to an extent which renders them difficult and disagreeable in all human relationships involving subordination."[4] (p. 261)

Until the 1900s, it was generally believed gifted students would naturally develop their own talents and become leaders in their fields. Research in the early 20th century, however, revealed that quite often a bright mind won't make its own way. As Switzer and Nourse point out, children frequently hide their talents so they won't be ostracized by their peers. They become bored with the slow pace of classwork and turn into behavior problems. Frequently, they drop out of school. In fact, as many as 30 percent of school drop outs are estimated to be gifted or talented.[5] Who knows how many of these youngsters could have been scientists or scholars *of Nobel class*[6] had they been provided the right environment to develop their potential? The advantages to be gained by meeting the special needs of gifted children should be obvious. Among these youngsters, properly nurtured, are many of our future intellectual leaders.

What happens to the gifted child who is not encouraged? The pressures on a child labeled an "egghead" or "brain" can be overwhelming. In addition to being more intelligent and creative, gifted children are often more mature than their peers. Being different, they suffer from feelings of loneliness and frustration. According to James T. Webb, Wright State University School of Professional Psychology, gifted children, particularly those with above-180 IQ's, are extremely prone to feelings of isola-

tion, which can turn into depression. These children are also prone to experience what Webb terms an "existential crisis"—a need to understand their role in the world and how they fit into a moral or value structure.[7]

Although giftedness can cause any child to have serious psychological problems, Webb believes gifted girls suffer more than boys. They are less likely to be encouraged to develop their potential. This is one of the big issues in the modern women's movement. But culturally deprived children suffer to an even greater extent. Besides being different from their peers, they often have trouble developing the social skills necessary for coping with giftedness. Webb cites as an example a child who walks into a town hall meeting and asks a particularly probing and sensitive question. When the council members have no answer, the child doesn't understand why people are embarrassed and uncomfortable.[7]

These feelings of isolation were also mentioned by Patrick Gunkel, a self-described "universalist" with the Hudson Institute and mentor to several "prodigious" (above-180 IQ) youngsters. He says one of his objectives in helping these children is to give them "a sense of pride, by assuring them they are normal, not freaks as they are typically treated."[8] Gunkel encourages these children by recommending and buying them books, putting them in contact with other prodigious youths, meeting with them to answer and pose challenging questions, and giving their parents reassurance they are not alone. Gunkel believes, in many cases, the "answer to troubledness is ideas...getting them thinking—getting them out of themselves...putting the emphasis on intellectual development."[8]

The problems of being gifted can be compounded by classroom conditions. In many instances, the teacher who must devote most of his or her attention to the average student resents challenging questions from the gifted. When this is the case, Jon C. Jacobs, Plymouth, Michigan, community school psychologist, says that the gifted child will not learn "that high intellectual ability is a desirable asset." Rather such children will subtly "be informed that their brightness, quickness is not as acceptable as the behavior of the less bright, more normal child."[9]

Even children who are recognized as gifted, and encouraged by parents and teachers, can suffer emotional damage. Some who attain success at an early age may find it hard to make the transition from a uniquely talented child to a competitive adolescent or adult. Many have difficulty accepting the fact that they won't always be number one. Andrea Williams of the White Oak, Pennsylvania, school system, reports, "It was alarming to see the number of gifted students who appeared to be self-confident, poised and daring, suddenly freeze under the idea of accepting wrongness, working with the unknown, or even the repercussions of success."[10] Many gifted children, used to drifting through school without being intellectually challenged, expect the remainder of life to be equally effortless. The rigors of a tough, competitive large university program can produce a kind of cultural shock. Such children may need more personal contact with teachers than others.

A major clinical teaching facility, which will include a component for studying and providing help to gifted children, is currently being developed at Wright State University, Dayton, Ohio. Funding for a clinical program for troubled and gifted youth has been provided by the parents of Dallas Egbert, a highly gifted student who committed suicide

last fall.[11,12] Although psychologists at the university are seeing highly gifted children on an individual basis, the clinical program at the facility for these youngsters is still in its embryonic state, according to Webb.

Webb believes this should be a national center where special services for the gifted can be provided. There generally are not enough gifted children in most cities and towns to justify special programs. Entire families of gifted children can benefit from the psychological counseling which can be offered. Parents can be aided in their adjustment to having a child who can outthink and outmaneuver them. Siblings—who usually compare themselves with a gifted brother or sister—can be taught to cope with feelings of inferiority.

Although minimal help is now available for gifted students with psychological problems, some programs have been developed to identify and encourage them. The Science Talent Search, sponsored by Westinghouse and administered by Science Service, Inc., which publishes *Science News*, is one of the most outstanding and well-known programs for youngsters gifted in science, mathematics, and engineering. Science Talent Search is responsible for the science fairs that so many *Current Contents*® readers participated in during high school. This is a program in which talented high school seniors conduct independent research. Through a series of local, regional, and national contests, they compete for scholarships and awards. For almost 40 years, the Science Talent Search has successfully encouraged young people to pursue scientific careers. A mail survey of 811 winners from 1942 to 1974 revealed 70 percent had acquired an MD or PhD. Of these winners, Leon Cooper, Ben R. Mottelson, Walter Gilbert, and Sheldon Glashow have won the Nobel prize, and Paul J. Cohen and David B. Mumford have won the Field Medal in Mathematics.[13] At least 15 have won Fulbright scholarships, two have been Rhodes Scholars and others have won awards indicating they are *of Nobel class*.[14,6]

Students gifted in math can also compete in the annual USA Mathematical Olympiad for prizes, honors, and a trip to Europe to compete in the International Mathematical Olympiad. Started in Rumania in 1959, and sponsored in the US by the Mathematical Association of America, this competition consists of a series of tests designed to measure mathematical intuition and creativity.[15]

These science and math competitions are designed to honor gifted students and to encourage them to pursue careers in these fields. Most students talented in these areas, however, are "nurtured" through special programs that permit them to take accelerated course work. This can mean taking courses not offered at their grade level, or enrolling in university-level classes.

The National Science Foundation (NSF), through its Student Science Training Program, offers scientifically inclined youngsters a chance to take summer courses, mostly at colleges, universities, and museums, and to conduct independent scientific projects. Mary Kohlerman, program manager, reports that a majority of the students who have participated in the 21-year-old program funded by NSF have pursued scientific careers.[16]

Johns Hopkins University has a similar program, administered by their office of talent identification and development. Julian C. Stanley, who runs the Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins, said that highly gifted seventh grade students from a seven-state area are identified through the Scholastic Aptitude Test (SAT),[17] the same examination adminis-

tered to college-bound high school seniors. The top one percent of these students are permitted to take college-level courses at Johns Hopkins and St. Mary's College. The others are given evaluations and are told of opportunities for accelerated education in their communities.[18] A talent search modeled after the Johns Hopkins program is being implemented at Duke University under the direction of Robert Sawyer, director, Talent Identification Program. This search will cover a 13-state area in the southern US.[19] The state of North Carolina has recently established the first public *residential* high school for 150 students gifted in science or math.[20]

The US is not alone in providing for the scientifically gifted. A program similar to the Westinghouse Science Talent Search is sponsored by Philips Electronic Instruments in Western Europe. Through the European Philips Contest for Young Scientists and Inventors, young scientists who win local and national contests compete with students from 15 other West European nations.[21]

In the Soviet Union, where scientific and mathematical education is emphasized by the state, students compete for positions at scientifically oriented universities through math and science "olympiads." Similar olympiads are offered as an extracurricular activity to students in Czechoslovakia. State scholarships to universities are offered to 350 students in India through a national science talent search scheme, whereas Turkish students compete through tests for positions at science high schools. Although these programs are not specifically designed to identify "gifted" students, the limited number of spaces usually insures that the most talented students are admitted. Programs for children gifted in the sciences were among the first offered specifically for gifted students in Israel. This is largely because many of the people who initiated programs for the gifted in Israel were science instructors.[22]

Interest in gifted students—particularly those with scientific talent—increased after the 1957 launching of Sputnik. At that time many countries became alarmed over the Soviet Union's apparent technological edge. However, the characteristics of scientifically gifted youngsters had been of interest to psychologists and educators for a number of years. In the early 1950s, Stanford University psychologist Louis M. Terman, in the fifth of his studies on a group of gifted children,[23] compared the scientists and nonscientists in a group of 800 men.[24] He found that early ability or interest in science was far more common among children who became scientists than among those who did not. Obvious as this statement may seem, it does indicate that scientifically talented youngsters should be identified and encouraged. As Catherine M. Cox, Stanford University, wrote in her 1926 report on the mental abilities exhibited in childhood by 300 eminent men and women, "The extraordinary genius who achieves the highest eminence is also the gifted individual whom intelligence tests discover in childhood."[25] (p. 218)

P. F. Brandwein, Teachers College, Columbia University, in his 1955 book *The Gifted Student as Future Scientist*, reported that those gifted students who do become scientists are generally very persistent, are dissatisfied with present explanations, and have an opportunity for advanced training in science. He found them to be "...more quiet, reflective, more inward-looking" than most other children.[26] These findings confirm those of Anne Roe, Harvard University, who, in *The Making of a Scientist*, examined the childhood and family background of 64 eminent scientists.

She reported those scientists were often the first-born children of middle-class families, who avoided social, religious, and political activity, and who married late.[27]

Directing their efforts toward broad questions about creativity and productivity, the University of Utah organized three conferences in the 1950s on the identification of creative scientific talent. During these NSF-supported conferences, psychologists, educators, and scientists presented their findings on a wide range of topics related to scientifically gifted children and adults. From a collection of papers from these conferences,[28] it appears that the participants agreed that creative scientists have a great need for autonomy and a special talent for "divergent," or flexible and open-minded, thinking.

Although such traits as persistency and introspection are particularly evident among scientifically gifted children, these youngsters also share a number of characteristics with non-scientifically gifted youth. They generally acquire speech and reading skills early, often have unusually good memories, are physically healthier and larger than most children, and prefer the company of older children and adults.

In a report to the US Congress, investigators for the US Department of Education also found these children explore ideas and issues earlier than their peers. The authors of the *Marland Report*, named for then Commissioner of Education Sidney Marland, state the "composite impression...is of a population which values independence, which prizes integrity and independent judgment in decision making, which rejects conformity for its own sake, and which possesses unusually high social ideals and values." According to this study, gifted and talented youth can be found in all socioeconomic groups.[29]

The *Marland Report* is credited with bringing the needs of gifted children to public light in the 1970s. However, research into the special characteristics of these children has been going on since the mid-18th century. Interest in individual intellectual differences, and their causes, was sparked by the 1869 publication of Sir Francis Galton's *Hereditary Genius*.[30] This book, and subsequent work by Galton, emphasized the hereditary transmission of intelligence. A forerunner of such contemporary education researchers as Arthur Jensen,[31] Galton was a founder of the Eugenics Education Society in Great Britain.

In the early 1900s, a seminal study (mentioned earlier in this essay) was initiated by the late Louis M. Terman.[23] In a project that is still being carried on by Pauline and Robert Sears,[32] retired, Stanford University, Terman compared the characteristics of 1,500 "geniuses" with those of matched normal youths. He defined genius as a child with an IQ of about 135 or more. Terman's purpose was to find out how this top one percent differed from normal youth and to follow these individuals for as many years as possible to "...check adult achievement against the promise of childhood and youth." Although subsequent studies of this group have shown them to be happier and more successful than the average adult, few have become unusually outstanding leaders in their fields.[32] Creative philanthropists like J. Roderick MacArthur want to believe that some of these individuals might have reached higher levels of achievement with financial help. The Catherine and John D. MacArthur Foundation, following the lead of such Renaissance patrons as the Medici's, has set aside $6.5 million to subsidize individual "geniuses." A talent search is now under way for these gifted adults from a number of different fields.[33]

Like the MacArthur Foundation, the US Congress has become concerned that the talents of thousands of gifted individuals are wasted. The two to five percent of the school age population estimated to be gifted, depending on your definition of the term, represents a significant pool of future leaders. Following the release of the *Marland Report* in 1971, the US Congress passed legislation providing funds for programs for gifted children, education of teachers of the gifted, research into these children's needs, a federal information center for the gifted, and for a federal Office of the Gifted and Talented (OGT).[34]

Since then, the OGT has funded special programs for gifted youth. In 1980, more than six million dollars was allocated for pilot programs for gifted children, most of which were administered by local school districts. OGT stipulated that 50 percent of the projects funded with this money have a component for education of disadvantaged children.

This year, for the first time, OGT has earmarked $90,000 for research. This money will go toward an evaluation of various tests for identifying gifted children.[35] Ninety thousand dollars doesn't go very far. But it is a start. I hope it will increase.

One major focus of giftedness research at present is identification of, and special programs for, minority gifted children. This is part of a wider effort in the US to improve educational opportunities for disadvantaged and minority children. Since most standardized tests used in schools are based on the dominant culture, efforts are being made to revise current tests, and to develop new tests which allow for cultural diversity. In the early 1960s some evidence had accumulated indicating children from disadvantaged groups compared favorably on tests of creative thinking, but not on verbal tests. In response to this finding, several educators advocate the use of creativity tests to identify culturally different children.

These creativity "tests" include questionnaires such as the Alpha Biographical Inventory,[36] which was developed to identify scientific talent among college graduates and graduate students, and the Torrance Tests of Creative Thinking.[37] Parents and teachers are also encouraged to notice children's strengths in such areas as ability to express feelings, originality in problem solving, and use of expressive speech.

A number of different intelligence or IQ tests are used to identify intellectually—rather than, for example, artistically—gifted children. The most popular of the individually administered tests are the Stanford-Binet Intelligence Scale[38] and the Wechsler Intelligence Scale for Children.[39] Other useful methods for identifying the intellectually gifted include teacher nomination, peer nomination, parent interview, and evaluation of student products. As a matter of fact, since as many as 50 percent of gifted children may be missed by group tests, it is best to use a combination of subjective and objective measures. As stated previously, scientifically gifted youngsters are sometimes recognized through their interest in science and through projects done for science fairs.

Educators are moving away from IQ tests such as the Stanford-Binet in their efforts to identify talented students, particularly those with non-academic gifts such as musical or artistic talent. Most *Current Contents* readers are probably familiar with the arguments against standardized testing. These arguments hold especially true for gifted

children, since most of the tests now available measure intellect rather than creativity, productive thinking, or the potential for these talents. James Alvino, Educational Improvement Center, Sewell, New Jersey, and Jerome Wieler, Children's Hospital and Medical Center, Boston, point out that the students who do well on standardized tests "have been able to conform their thinking to the dictates of psychometrically determined systems of relevance."[40] Consequently, the more creative and the minority students who don't conform to certain accepted norms of learning and thinking are handicapped by these tests.

Most of the giftedness research now underway is being done by doctoral candidates at such institutions as Teachers College of Columbia University, and the Universities of Connecticut, Georgia, and South Florida. These graduate students are investigating and evaluating various identification procedures and curricula for gifted children. These, and the other universities offering course work in gifted education, are involved in the development of educational materials and programs for gifted children.

Since these programs are administered by state and local school districts, a wide variety of educational methods are being used. Many educators have found that acceleration, covering course work at a faster than normal pace, works well for students gifted in science and math. Often this means permitting young children to take college courses. Enrichment programs, which go beyond normal classwork by offering the students the opportunity for in-depth investigation, are also common in curricula for the gifted. One widely used program is the Enrichment Triad Model developed by J. S. Renzulli, director, Teaching of the Talented Program, University of Connecticut. This program permits students to pursue their own interests using their own learning styles. Its objective is to help students develop the independent, critical thinking abilities necessary to learning in any discipline. The "resource teachers" heading these programs guide their students, much as a doctoral advisor serves the graduate student, in independent research projects.[41,42]

Much of the current research on "developmental stage theory" is closely related to questions faced by researchers and educators of the gifted. Work in this field has focused on new models of child development and on the functioning of the right and left hemispheres of the brain. This work builds upon the cognitive stages and affective stages of development, areas pioneered, respectively, by Jean Piaget[43] and E. Erikson.[44] Their research, and work being done to develop programs for gifted children, also relies upon John Guilford's "Structure of the Intellect"[45] model and B. S. Bloom's educational taxonomy.[46] These systems were designed as comprehensive foundations for the description and study of different abilities which fall under the general heading of intelligence.

A number of organizations are concerned with gifted children. As shown in Table 1, their memberships consist of

Table 1: Organizations and Resources

Name and Address	Membership/Function
The Association for the Gifted, Council for Exceptional Children, 316 W. Second St., Suite PH-C, Los Angeles, CA 90012	Research, education, and some parent associations belong to this umbrella organization.
National Association for Gifted Children, 213 Gregory Dr., Hot Springs, AR 71901	Association of researchers, educators, and parents.
American Association for Gifted Children, 15 Gramercy Park, New York, NY 10003	Parent and educators association.

National Foundation for Gifted and Creative Children, 395 Diamond Hill Rd., Warwick, RI 02886	Parent advocacy group.
National/State Leadership Training Institute on Gifted and Talented, 316 W. Second St., Suite PH-C, Los Angeles, CA 90012	Federally funded organization for training of parents, educators, and administrators of the gifted.
World Council for the Gifted, c/o Milton Gold, Executive Secretary, Teachers College, Columbia University, New York, NY 10027	International association of researchers and educators. Sponsors international conferences.
National Association for Gifted Children, 27 John Adam St., London WC2N 6HX, England.	Parents, educators, and administrators.
Creative Education Foundation Inc., State Univ. College at Buffalo, Chase Hall, 1300 Elmwood Ave., Buffalo, NY 14222	Parents, educators, and administrators.
National Association for Creative Children and Adults, 8080 Spring Valley Dr., Cincinnati, OH 45236	Parents, educators interested in promoting creativity.
Institute for Behavioral Research in Creativity, 1570 South 11th East, Salt Lake City, UT 84105	Creativity research organization.
Office of the Gifted and Talented, US Department of Education, 400 Maryland Avenue, SW, Donohoe 3827, Washington, DC 20202	Funds educational programs and research. Supplies fact sheets to parents, educators, and administrators.
ERIC (Educational Resources Information Center) Clearinghouse on Handicapped and Gifted, 1920 Association Dr., Reston, VA 22091	Clearinghouse for information on the gifted.

parents along with researchers, educators, and administrators. We have included organizations that focus on creativity in this table because they are involved in programs for creatively as well as intellectually gifted youth. The OGT and the ERIC Clearinghouse on Handicapped and Gifted are excellent sources of information.

The *Gifted Child Quarterly*, covered by the *Social Sciences Citation Index®* and *Current Contents/Social & Behavioral Sciences*, is the chief research journal in the field. Our list of journals, presented in Table 2, also includes periodicals of interest to parents and others who advocate special educational programs for the gifted. The preparation of this essay has led to the evaluation of several new journals for potential coverage in ISI® services in the future.

Support for the gifted and the talented is now on the upswing. Forty US states have employees concerned with education of this group and 18 universities are offering graduate programs in education of the gifted. Although funding is going toward the development of special programs, researchers and educators are still far from defining or implementing programs that fulfill the special needs of these children. If, indeed, equal educational opportunity means giving each individual a chance to develop his or her full potential, then we ought to learn as much as we can about the special needs of gifted children through adequate research.

It is interesting that in the new high school established at Durham, North Carolina,[20] more than half the students have a keen interest in music. This is not

Table 2: Journals

Journal Name and Address	Description
**Gifted Child Quarterly*, 217 Gregory Dr., Hot Springs, AR 71901	Scholarly journal containing articles on pilot programs and giftedness research.
Journal for the Education of the Gifted, The Association for the Gifted, Council for Exceptional Children, 1920 Association Dr., Reston, VA 22091	Scholarly journal focusing on giftedness research and education.
G/C/T (Gifted/Creative/Talented), Box 55564, Mobile, AL 36606	Articles on identifying and educating the creative and gifted. Other items of interest to parents and teachers of gifted and creative.
Journal of Creative Behavior, Creative Education Foundation Inc., State Univ. College at Buffalo, 1300 Elmwood Ave., Buffalo, NY 14222	Range of articles on research in creativity, creative problem solving, creative educational methods.
The Creative Child and Adult Quarterly, National Association for Creative Children and Adults, 8080 Spring Valley Dr., Cincinnati, OH 45236	Research and education oriented journal on creative and gifted creative.

*Covered by *Current Contents®/Social & Behavioral Sciences* and *Social Sciences Citation Index®*

a particularly new finding but it is a reminder that there need not be an artificial separation of the arts from the sciences. Also, as Gunkel pointed out, unexpected chance occurrences in growing up may make a difference. Programs for gifted children can significantly increase the chances that the right events will occur. Probably the most significant of these is an encounter with a gifted adult who can help motivate the gifted child to achieve his or her full potential.

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