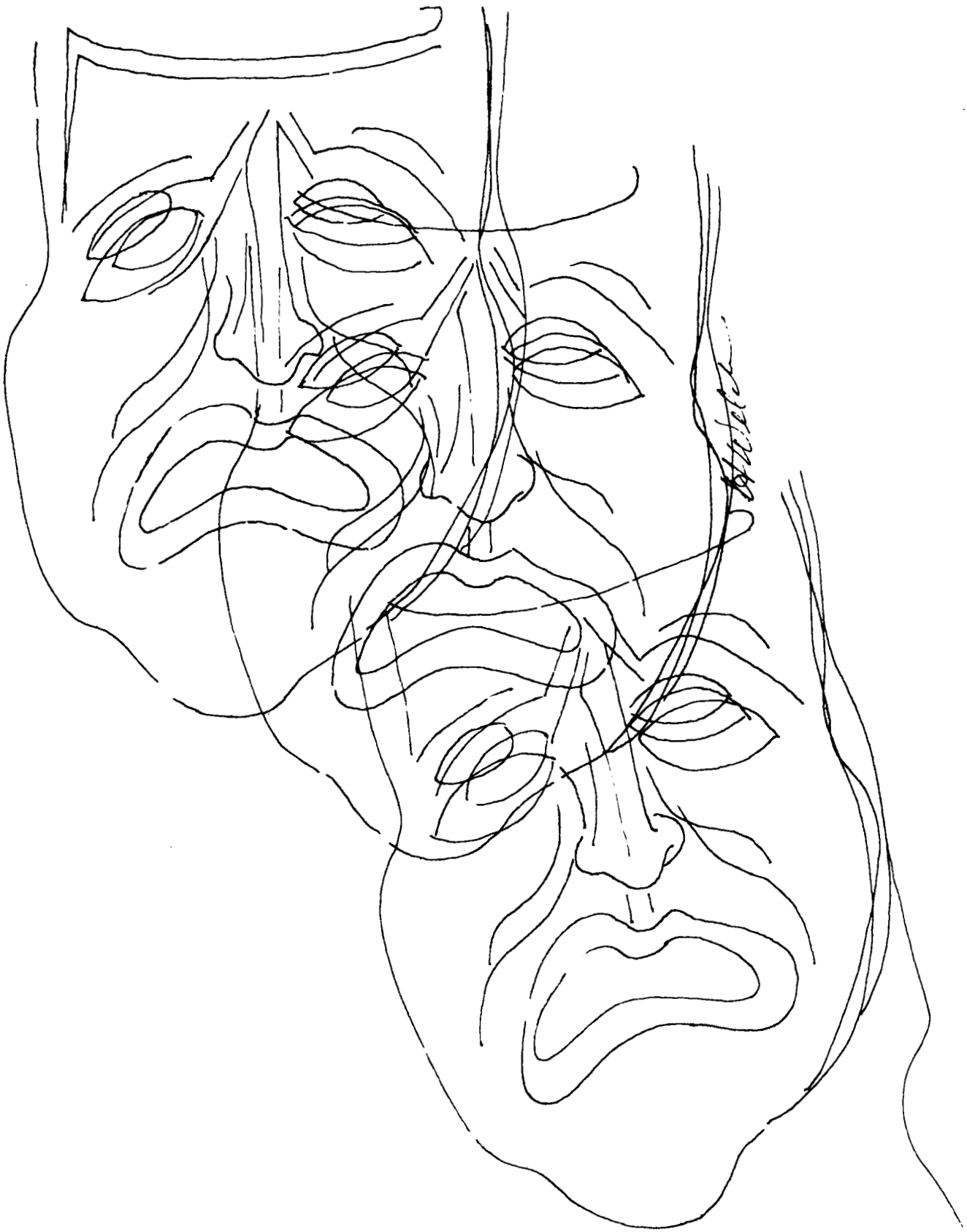
Educational Non-acceleration: An International Tragedy

by Julian Stanley



(This article represents an updated version of Dr. Stanley's invited address to the Second World Conference on Gifted and Talented Children held at the University of San Francisco, August 2, 1977.

Let me begin by sharing with you a portion of a letter I received from a highly gifted Chinese-American girl who had recently completed the ninth grade. It is, unfortunately, a rather typical example of how educators often frustrate the gifted, especially before senior high school.

> Dear Professor Stanley:
>
> Thank you very much for your encouraging letter.
>
> In June 1973, at the end of my 5th grade school year, I took the New York State Algebra I Regents, and scored 98%. In September of the same year, I moved to Maryland. _____ County Public Schools chose not to acknowledge this fact (i.e., the high test score), and I was placed in a 6th grade math class. Having finished the 6th grade text in 1½ months, I was told to "do it over again for a review." I then spent the rest of the year reading books placed between the covers of my math book. Finally, at the end of much frustration, I was placed in an accelerated math class for gifted children, at the beginning of 8th grade. Even then, I had to re-take Algebra I. However, the pace was much faster, and I enjoyed it, especially during the past year, when we covered Algebra II-Trig. with _____ (a teacher trained under the auspices of the Study of Mathematically Precocious Youth (SMPY).
>
> I have been accepted to the _____ Academy. I want to set up a challenging schedule, using your letter as a reference.
>
> Should I need any further guidance, I shall be in touch, but I believe the frustrating, wasted years are ending, and the future looks brighter.
>
> Thank you for taking the time and consideration to show that someone does care.
>
> Sincerely,
> _____

Many intellectually brilliant youths eager to proceed faster educationally have been prevented from doing so by their parents, educators, or psychologists. The United States is a serious offender in this respect, but I know from personal observation that the situation is even worse in a number of other countries. This brings to mind the horrible Greek legend about Procrustes, who forced his guests to lie on a very long or a very short bed and fitted them to it by stretching them if the bed was too long or by cutting off part of their legs if the bed was too short. The age-in-grade lockstep is a Procrustean solution endorsed by all but a few.

Yet a vast amount of substantial evidence accumulated for more than half a century shows that highly able youths who want to quicken their educational pace in a number of ways would be well advised to break the lockstep. As Daurio (1978) set forth in a long review, there is no substantial evidence to the contrary. The oft-sounded fears that educational acceleration will hurt the social and emotional development of intellectually highly talented youths in the United States who want to move ahead faster than their agemates are groundless. On the contrary, frustrating the natural pace of highly apt students can cause serious academic and emotional damage.

How did this false "social and emotional development" shibboleth become so ingrained that it caused educational acceleration, common and successful in the past when tutors prepared youths for higher education, to be replaced by often vacuous or irrelevant so-called educational "enrichment?" At a superficial level it is obvious that the word "enrichment" has a wonderful sound, akin to some of the other catchwords of which educators are fond--for example, "creativity" and "whole child"--whereas the term "educational acceleration" lacks glamour. But I suspect that the main causes of resistance to acceleration are much deeper than a euphemism for busywork, fun-and-games, and whatever special subject matter the school wants to offer its many varieties of talent. The almost rabid egalitarianism of my countrymen plays a strong part, as do considerations of scheduling convenience and simple ignorance about the research literature. Envy and distrust of the intellectually talented, who make excellent grades in school without half trying, are not new phenomena.

Most harmful of all seems to be the "I knew a person who . . ." way of substituting anecdotes, often untrue, and outright rumors for more careful consideration of the issues. Like all kinds of prejudice, this is reinforced by making unreasonable demands of the object against which one is prejudiced. For example, if a student enters college full-time at age 15 or 16 and does not achieve magnificently, he or she is considered a failure ascribable to under-agedness. If, however, the same student enters college at the "regular age" of 17 or 18 and does poorly, causes other than being age-in-grade are sought. To prove that beginning college work younger than the norm is not harmful, the critic of educational acceleration demands that every such youth be highly successful academically, whereas no such lofty expectations are entertained for the age-in-grade undergraduates.

The situation is even more no-win than that, because no matter how well the young college student does academically the critics will usually assume that he or she would have developed better socially and emotionally by not moving ahead educationally faster than one school year at a time. This dogmatic stance will be maintained in the face of all contrary evidence, including the youth's own protestations that he or she is much happier being accelerated. This unreasoned assumption that only one's agemates are one's social and emotional peers is a gross denial of individual differences and of the great adjustive capacities of many intellectually highly talented youths. More than perhaps anything else, it is frustrating the fulfillment of the intellectual and personal needs of brilliant students.

Many parents join wholeheartedly with educators in this conspiracy to restrain their well-qualified, eager children from moving ahead at the accelerated paces natural for them. Often, too, even when acceleration is recommended by school personnel, parents are reluctant or obstructive. Many parents let golden opportunities for acceleration pass by, either by cautious inaction or outright refusal. Few parents of intellectually talented children seem excellently qualified for that demanding role. Most of them do not realize how hard and ingeniously they must work with educators and others in order that their children will develop appropriately.

Closely related to this is failure of most parents to get their intellectually talented offspring deeply involved in the educational decision-making process nearly early enough. For example, a youth not yet seven years old who, according to a standardized test, has the reading ability of an average twelfth-grader (as one of our proteges indeed did) should already be helping to make educational choices for himself. In this connection it is important to fit the student's choice-making responsibilities more to his or her mental age than chronological age.

In our work with 6400 students of both sexes who reason extremely well mathematically, we at SMPY and our colleagues from Dr. Lynn Fox's Intellectually Gifted Child Study Group (IGCSG) at The Johns Hopkins University have encountered all types of parents. A particularly overwhelming variety is the authoritarian, aggressive, dominating mother or father--especially of a son--who wants to plan everything for the child right through four years of college. Despite our best efforts, such parents give their children little say in the educational process. Often the youngster grows resistant to the parents' suggestions and to ours. Information from us conveyed to him or her via the parents proves much less effective than if the youth were directly involved.

Another type of parent that seems not ideal for intellectually talented youths might be termed "laissez-faire." This mother or father makes remarks such as "I don't want to push my children." "I just want my child to be normal," "I want my child to be well-rounded," and especially "I'm more interested in my child's social and emotional development than in his becoming a genius." Often these statements reflect the parents' unwillingness to work hard on their child's behalf. Sometimes they indicate a family so strongly oriented toward activities such as sports, music, and church that special educational opportunities have low priority.

Many families seem confused about distinctions among the following three things: inspiring a brilliant youth to *want* to excel educationally, pushing the child beyond his or her own desires, and adopting a hands-off attitude. Long-term educational stimulation by parents is virtually essential, but to be effective it must be done via love and hard work rather than coercion and exploitation. Helping parents to

become better facilitators of their intellectually talented children's education pays rich dividends for those youths and for society. This is why, at SMPY, we correspond and interact directly with the mathematically precocious youth themselves to the greatest extent possible.

AN INDIVIDUAL DIFFERENCES MODEL FOR EDUCATIONAL ACCELERATION

Perhaps current pressures against letting eager youths move ahead educationally at their preferred rates can be illustrated well by an analogy. Suppose that in some remote country, two persons can each run 1600 meters (about a mile) in less than four minutes, but no one else can do so under six minutes. We might wonder about the human physiology, training, and restrictions in such a country, because it is well known that in other countries a more even distribution of running times accords with the natural abilities of the runners. Given freedom of expression and of training, some persons should be running between four and four and one-half minutes, more at four and one-half to five, still more in the five-minute interval, and the most at whatever the mode of the running population is. Aptitude for running, opportunities to train well, and motivation to run fast are important, individually and interactively. We would not expect running times to be distributed normally, because the absolute lower limit is less than four minutes below the best times, whereas the worst running time is plus infinity. If every member of some group, say 16-year-old males, were required to run the 1600-meter distance regularly we would expect considerable continuity along the time dimension, but a somewhat positively skewed distribution of times. It is easier to run slow than to run extremely fast, but quite a few of the runners would be equipped by aptitude and motivation to run much faster than the average of the group. If they did not do so we would be surprised and puzzled.

The 1600-meter runners of that strange country are like our intellectually highly talented students. Occasionally, such a student breaks the bonds of the age-in-grade educational lockstep and streaks ahead to an early baccalaureate or doctor's degree, but the best that most manage is to complete college at the "standard" age. They spend 17 years traversing the 17-year period from the beginning of kindergarten through the end of the fourth year of college. A few save a year or even two years along the way--that is, as much as 12% of the time. Many take longer or don't ever earn the bachelor's degree.

The gap between the youngest recipients of the initial college degree and the age of most of the recipients is at least eight years. We know, for example, that Merrill Kenneth Wolf received his B.A. degree from Yale University in 1945 when he was barely 14 years old. Norbert Weiner received his from Tufts University (then Tufts College) before his 15th birthday. Yet 73% of the recipients of baccalaureates at Johns Hopkins in 1971, the year that SMPY began, were age-in-grade by the strict criterion of becoming 22 years old during the calendar year in which one was graduated. (Actually, some whom we considered a year over-age because they became 23 years old in 1971 were actually right on their own schools' schedules, so the correct percent is appreciably greater than 73). Only three of the 447 graduates were still 20 years old on 31 December 1971, which by our criterion means just two years of acceleration. None was younger.

Thus it would seem that a chasm yawns between the 14-year-old fast-movers and the norm of progress. The 8-year gap is 47 percent of the 17 years of schooling. Were Lewis Terman alive today he would probably point out that a well-motivated, highly facilitated student with an IQ over 200 should be able to complete his or her schooling in about half the usual time. He had deplored the lack of educational speed in his gifted group.

But, someone would argue, Wolf and Wiener are great exceptions, virtually unique; almost no one else among the more than 3,000,000 children born in the United States each year could match their feats. Evidence, both from the past and more recently, does not support this argument. With only moderate facilitation in mathematics for three years Eric Robert Jablow was found by SMPY to be ready to become a full-time student at Brooklyn College at age 11½, after completing the sixth grade of a public school. Though he accelerated no more, Eric was graduated with a major in mathematics, *summa cum laude*, this June less than three months after his 15th birthday. In September of 1972 he became a student

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at Princeton University, working toward the Ph.D. degree in mathematics under a three-year graduate fellowship that he had won from the National Science Foundation. Eric could easily have saved another if he and his parents had wanted him to do so. He is extremely able, well adjusted, and splendidly motivated, of course, but each year or so in the New York City area or in the vicinity of any large city there are likely to be several other students as academically promising as he. They could readily complete the bachelor's degree with distinction at a selective college by age 14, 15, or 16.

Among the more than 1000 high-IQ youths in Terman's classic study of gifted children only one earned a bachelor's degree as young as age 16. He was graduated from Columbia University, having majored in chemistry and having been elected to membership in Phi Beta Kappa. Only two of the group finished college while still 17. One who completed college at barely age 18 is a famed psychometrician, well known--at least by professional reputation-to nearly all of you. At an extremely early age he was elected president of the American Psychological Association. Keep in Mind that Terman made no direct effort to help any of his group move ahead faster in school.

SMPY's intent is strongly interventional. We aim to foster as much educational acceleration among our large number of proteges *as they are eager to try*. Because SMPY began only recently, in September 1971, chiefly with seventh and eighth graders, there has not yet been time for many of our participants to complete their baccalaureates early, much less their doctorates. Amazingly, though, even from the chiefly Baltimore area talent search we conducted in March of the 1972 that had only 450 contestants in mathematics and/or general science have already come four under-age graduates of Johns Hopkins.

In May of 1977 one of these finished his Bachelor of Engineering Science degree in electrical engineering, Phi Beta Kappa and with a National Science Foundation three-year graduate fellowship, three months before his 18th birthday. How did this young man move so fast? As a seventh grader he had entered SMPY's March 1972 talent search in both mathematics and college-level general science. He was the top scorer of all 192 science contestants (many of them eighth or even under-age ninth graders) and had ranked third among the 396 who took two difficult mathematics tests.

During the summer of 1972 this youth and four other of SMPY's male participants took college courses in mathematics at Towson State College. He enrolled for college algebra and trigonometry and for analytic geometry concurrently and made final grades of "A" in both.[1] Then he skipped the eighth, eleventh, and twelfth grades and completed his work at Johns Hopkins in three years. In the fall of 1977 he began work toward the Ph.D. degree in computer science at Cornell University.

Another of the original talent-search group was also graduated from Johns Hopkins in May of 1977 at age 17, two months before his 18th birthday. He, too, won a National Science Foundation three-year graduate fellowship, which he is now using in electrical engineering at the Massachusetts Institute of Technology. He had skipped the second, eleventh, and twelfth grades and entered with 39 semester-hour credits already earned by means of college courses taken part-time from the middle of the eighth grade onward. Thus it was convenient for him to earn his degree in three years.

Each of the other two young men from the original talent search earned his degree "only" three years early. One did so by skipping grades 10, 11, and 12. Graduated at 18, Phi Beta Kappa, with a *summa cum laude* record and a three-year National Science Foundation graduate fellowship,[2] he is now working toward a Ph.D. degree in theoretical physics at Princeton University.

[1] All five boys earned "A" in college algebra and trigonometry, and three of the four who took analytic geometry earned "A" in it, too. The other earned a "B", chiefly because he had transportation difficulties. For further discussion of this class, see Keating, Wiegand, and Fox (1974).

[2] Lest it begin to seem that most of graduates of Johns Hopkins receive three-year NSF graduate fellowships, let me point out that these three young men won half of all such awards at Johns Hopkins in 1977 and 3/550ths of all such awards in all eligible fields of science for the entire country. Because SMPY's proteges at Brooklyn College (already mentioned) and George Washington University also won NSF graduate fellowships in 1977, the members of our relatively small group got nearly 1 percent of all the NSF fellowships anywhere. That is a truly remarkable achievement, especially when one considers that these graduates were accelerated in grade placement from 3 to 7 years.

The other one of the four accelerants, who finished at age 19, majored in mathematics and earned good grades. He is working full-time as a data analyst and pursuing his hobby, the playing of bridge.

Besides the extreme prodigy at Brooklyn College who has already been discussed, it is worthwhile to consider four other early graduates under SMPY's auspices. One of these came from SMPY's January 1973 talent search. He skipped the seventh, ninth, tenth, and twelfth grades and completed college in five semesters. He became 17 years old in December of 1976 and finished his college work that month. Currently, he is attending the University of Chicago and working toward the Master of Business Administration and Ph.D. in economics degrees.

A boy who did not come through one of our contests but whom we helped decide to start college early was graduated, Phi Beta Kappa, from George Washington University in June of 1977 at age 18 with a baccalaureate in mathematical statistics and an NSF fellowship. In the fall of 1977 he became a doctoral student in mathematical statistics at Stanford University.[3]

Two years before SMPY began, Joseph Louis Bates entered Johns Hopkins as a regular freshman at age 13. Four years later, at age 17 years 7 months, he received a B.A. degree in quantitative studies. By the end of that summer, at age 17 years 10 months, he had a master's degree in electrical engineering. Then he went to Cornell University to work toward a Ph.D. degree in computer science.

The final example was a young man who entered Johns Hopkins in the fall of 1972 after the tenth grade of a public school, transferred to Princeton University the next fall, and was graduated there in mathematics, *summa cum laude* and Phi Beta Kappa, in June of 1976. He, too, won a three-year NSF graduate fellowship. In the fall of 1976 he began work toward the Ph.D. degree in mathematics at the University of California (Berkeley). Within nine months he had earned a Master's degree in mathematics and continued toward the doctorate.

To recapitulate, the SMPY's college graduates as of May 1977 totaled nine. Six of these took the baccalaureate at Johns Hopkins, four of them in two and one-half to three years. One took a master's degree concurrently with his bachelor's. They ranged in age from barely 17 to 19. The three others took their bachelor's degrees elsewhere at ages 15 to barely 20. Four were elected to Phi Beta Kappa, and another had a 3.96 average (where 4.00 is straight A) but seemed not to meet the Phi Beta Kappa requirements of his college because he took a Bachelor of Science degree. Six of the nine won NSF three-year graduate fellowships. All reported being quite glad that they had come to college early. All seemed satisfied with their social development and emotional stability. Several of them began research and writing careers as undergraduates.

All but two of the nine had come from public schools in Baltimore, Baltimore County, or nearby Howard County. If in this new endeavor SMPY with its small resources, working in a geographical area not especially noted for concentration of intellectual talent, can help produce this much acceleration, think of how much more would have resulted from a larger effort! Instead of being proud that at the 1977 commencement it had five graduates younger than anyone in a usual class of about 500, perhaps those who make policy at Johns Hopkins should have been chagrined that there were not at least 25. It is probable, though, that even in its small graduating class Johns Hopkins had more graduates in 1977 who were accelerated at least three years than did any other university in the country. According to Alexander W. Astin's annual reports for the American Council on Education, only about one freshman in 1000 is still 16 years old on December 31 of the year in which he or she enters college--that is, only one-tenth of 1 percent are even two years accelerated when they begin.

We at SMPY consider this a serious failure to provide adequately for intellectually brilliant youths eager to move fast through college and to an early doctorate so that they will have more time and energy for creative work postdoctorally. Indeed, as the title to this paper indicates, educational non-acceleration may well be an international tragedy, wasting the talents of many youths. We make no argument that any student should be urged ahead at a pace or in a manner about which he or she is unenthu-

[3] For further information concerning the seven early graduates discussed thus far see *Time* (1977) and Nevin (1977). Some of their characteristics are also discussed in Stanley (1976, pp. 19-21).

siastic, but only that the best-motivated should have a clear field.

THE SUCCESS OF RADICAL ACCELERANTS

At this point many may object and say it is well known that the typical intellectual prodigy does not amount to much in the long run. A great deal of this inaccurate feeling probably derives from the enormous amount of unfavorable publicity that the sad case of William James Sidis received during the first half of this century. Montour (1977) has researched that story carefully and reported her findings in a perceptive fashion. Her article is essential reading for all persons seriously interested in the welfare of intellectually talented youths. In this and a number of other studies (Montour 1976 a-k and 1978 a, b) she shows that nearly all intellectually brilliant persons who manage to move through school fast lead happy, successful lives, especially if interpreted in terms of their own goals rather than of the stereotypes that society has about success.

For example, most educated persons in many countries have heard about how Norbert Wiener coined the word "cybernetics" ("the theoretical study of control processes in electronic, mechanical, and biological systems, especially the mathematical analysis of the flow of information in such systems"--*American Heritage Dictionary of the English Language)* and contributed much to it. He was one of the most important applied mathematicians and electrical engineers from about 1919 onward for 45 years. That was a great deal of success for one who received his baccalaureate at age 14 and his Ph.D. degree at 18. Wiener did this despite--or perhaps partically because of--an extremely demanding father. For details, see his two interesting autobiographical volumes, *Exprodigy* (1953) and *I Am A Mathematician* (1956).

How well did Merrill Kenneth Wolf, the youngest college graduate of whom we are aware, do after completing his B.A. degree in music theory under Paul Hindemith at Yale in 1945 when he was barely 14 years old? For some seven years thereafter he studied keyboard instruments such as the piano, organ, and harpsichord under Arthur Schnabel and others before entering medical school at age 21. Today he is a professor of (neuro) anatomy at the University of Massachusetts Medical School after formerly having been associate professor at the Harvard Medical School. By any reasonable standards Dr. Wolf is quite successful. His music is still a source of pleasure to him, especially during summers. (See Keating, 1976, name index).

Another highly successful prodigy (Ph.D. degree from MIT at age 20) is the Harvard University Nobel Laureate chemist, Robert Burns Woodward (See Feinstein, 1977). Perhaps the most prominent young mathematician in the country is Charles Louis Fefferman, who completed his bachelor's degree in mathematics and physics at the University of Maryland at age 17 and his doctorate in mathematics at age 20. By age 22 he was a full professor of mathematics at the University of Chicago, the youngest professor that distinguished institution has ever had. At age 24 he moved to Princeton University and became its youngest professor ever, also. Three years later he was the first recipient of the $150,000 Alan Waterman Award of the National Academy of Sciences. In 1977 he became 28 years old, about the age at which many first-rate persons receive their Ph.D. degrees. It is clear that the years of schooling he saved (at least five) have proved invaluable thus far.

Of course, it would be unreasonable to expect the typical early graduate from college to become as successful as Weiner, Woodward, Fefferman, or even Wolf. To us at SMPY it seems sufficient that youths who reason extremely well mathematically and who are strongly motivated to plunge ahead educationally be helped to attend excellent colleges and get first-rate doctorates at an early age, rather than marking time in high school and then perhaps being unwilling to face the stiff competition of the top institutions of higher education. We are content to see our proteges use their talents appreciably better than they might have done otherwise.

Nevertheless, there are already strong signs of research creativity in most of the nine graduates thus far. At age 17 one found the solution to a previously unsolved computer problem. Another had an article published when he was 16. One worked during part of two summers as a research assistant at two major research institutions before he became 17. At 18 another gave an invited paper at a conference on theoretical physics. One's honors thesis for the bachelor's degree was so excellent

that he was immediately elected to membership in Sigma Zi, the graduate honorary scientific society. One is developing a computer device that has excellent commercial possibilities. Several other remarkable achievements in addition to getting the initial degree early could be cited.

These activities are occurring even sooner in the school career of the early graduates than for the typical brilliant age-in-grade student. Instead of being postponed until the last year or two of graduate school or beyond, they have been moved back to the undergraduate years. As undergraduates the early graduates were even more professional and research-oriented than were their equally able but considerably older classmates. We consider this a favorable sign indeed.

Only the years will reveal how scientifically creative these young men will become. We have no carefully matched control group with which to compare them. Compared with the substantial but lesser attainments of other youths in our study, however, the radical accelerants seem thus far to be the most promising subgroup of the talent-search participants. This is not due to factors in parental backgrounds favoring the accelerants, because our youths from strongly professional homes seem less likely to accelerate their educational progress drastically than are the children of persons somewhat lower in the socioeconomic scale.

Occupations of the fathers of the nine early graduates when the latter were college seniors are revealing: certified public accountant, district sales manager of a large company, engineer, owner-operator of an ice-cream shop, owner-operator of a pest-control service, paper salesman, part owner of a home-improvement company, retired FBI agent, and teacher of mathematics. None was the child of a physician, lawyer, male college professor (one mother was then an associate professor), or wealthy business man. Both parents are alive and living together. So far as we are aware, there has not been a divorce in any of these nine families. Apparently, it takes a great deal of parental stability and encouragement to produce successful accelerants, but not excellent parental educations or high incomes.

SMPY MOVES ALONG

I am tempted to give you a great deal of technical information about SMPY, but that would limit our time for discussion here. It is unnecessary, because SMPY's work thus far has been reported extensively in a number of easily available books and articles. Suffice it to reiterate that our efforts are resolutely interventional, longitudinal, and accelerative. We are proud of our strong emphasis on trying to help these youths improve their educational opportunities over the years until they enter an outstanding college or university as full-time undergraduates, preferably with sophomore standing. Many persons talk enthusiastically about the needs of the gifted, but during the years since Terman began his monumental follow-up study in 1921 all too few educators and psychologists have actually done much educationally for intellectually talented youths that is really substantial. Quite a few have spent most of their time seeking large amounts of money, despite the fact that the provisions SMPY discusses require mainly initiative and actually save the student's parents and the schools money. (Some of these provisions will be discussed below.)

We are especially proud of SMPY's almost unique stress on educational acceleration as one of the prime methods for helping brilliant youths who want to escape the age-in-grade lockstep. We owe a great debt to Terman and our still-alive but aged friends Sidney Pressey (1949), Dean Worcester (1956), and James Hobson (1963), three who almost singlehandedly contradicted the common "wisdom" which said that most educational acceleration was undesirable. We owe much to persons at the University of Chicago during the 1930's, such as Robert Hutchins and Ralph Tyler, who made that fine institution the country's haven for early entrants and early graduates then. We thank Hutchins and the Fund for the Advancement of Education of the Ford Foundation for their highly successful early-entrance experiment of the 1950's (see FAE 1953, 1957).

We have taken over with great energy and zeal the difficult and highly unpopular task of making avenues to educational accelearation much more accessible than they were almost anywhere. Our work in Maryland and adjoining areas is prototypal. We develop principles, practices, techniques, and programs that are widely applicable. If we can do that in a short while with great success in a typical state of the Union, so can others elsewhere–and all the more so if

they have a larger percentage of extremely talented youths with whom to work than we do. Let us consider briefly some of the main means by which SMPY has striven to improve the educational opportunities of those students who, when in junior high school, reason at least as well mathematically as the upper 2 or 3 percent of their age group in the country do.

VARIOUS WAYS TO ACCELERATE

The following possibilities are not listed in order of importance, but instead somewhat chronologically:

1. Enter school early, especially if the child is intellectually quite precocious and would otherwise be "old in grade." For example, if according to school-board rules the child must become 5 years old by December 31 of the year in which he or she would enter kindergarten but misses this deadline by only a month or two, enrollment in kindergarten "a year early" should be considered carefully if the child's mental age will exceed that of the average kindergarten in the group to be entered. Some consideration should also be given to the child's size and presumed social and emotional development, but the decision must be based on long-term considerations. Of extreme importance for this decision is the Stanford-Binet-type IQ. Beginning kindergarten early will often be preferable to skipping a later grade (especially the first or second) where friendship cliques have already been formed. See Worcester (1956) and Hobson (1963).

2. Skip the last grade before moving from one level of school to another school at the next level, such as the last grade of elementary, middle, or junior high school. Then the student will be with a group making new friendships and will not be as conspicuous as if a grade were skipped within a school. For any grade-skipping, high ability and personal eagerness to move ahead are essential. For some skips, tutoring in certain subjects during either the year before the skip or in the grade to which skipped may be desirable. Sensible election of subjects is essential, of course. For example, one would not ordinarily take French II without adequate background in first-year French, or Algebra II without knowing Algebra I. This does not mean that a full year of French I or Algebra I will be needed, but just that equivalent knowledge of the prerequisite material, however gained, is important.

3. Skip the last year or two of senior high school and go on to college fulltime. Of course, one must plan ahead in order to do this effectively and efficiently. A number of SMPY participants have found early entrance to college an ideal way to avoid "senior rot," as some of them term the boredom resulting from the last year in high school. Usually, after one year of successful course work in college they are given diplomas from the high schools previously attended. See Stanley (1976a).

4. Plan carefully in order to be graduated from high school a year early, perhaps by taking required senior-class courses during the tenth and eleventh grades.

5. Enter a certain course, such as Algebra I, a year or more early. Quite a few seventh graders can do well in the first year or algebra, even though it may be scheduled primarily for eighth or ninth graders. An occasional student even younger can.

6. Complete two or more years of a subject in one year. For example, do Algebra I and II or Algebra II and plane geometry in a single school year. A variety of fast-mathematics classes pioneered by SMPY accomplish this objective well. Some highly able, well motivated seventh-graders learned Algebra I-III, plane geometry, trigonometry, and analytic geometry--which usually take about four and one-half years in school--by studying on Saturday mornings for 13 months (late June through next early August) with a special teacher. They were then ready for the calculus. See Fox (1974), George and Denhan (1976), George (1976), Stanley (1976b), and Stanley (1977).

7. Have a special "mentor" pace, stimulate, and tutor the brilliant student rapidly through various mathematics courses. We at SMPY have found that when this is done properly it can be more effective than any other procedure yet tried. For example, seventh graders who reason extremely well mathematically can learn first-year high-school algebra with a skilled mentor excellently in anywhere from nearly zero to about 15 hours. Such students can be worked with in two- or three-hour sessions once weekly and do a great deal of well-designed homework between sessions. Success should be judged by performance on a

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standardized Algebra I test such as that of the Cooperative Achievement Tests series or on a suitably broad-based test prepared within the student's school system. If the latter is to be taken, of course the mentor will use instructional materials appropriate for its objectives. Participants in SMPY's talent searches who score extremely high on the mathematical part of the Scholastic Aptitude Test of the College Board, which SMPY uses, are offered the opportunity to work with mentors in flexible groups of 1-5 students per mentor that are homogeneous with respect to current level of mathematics.

8. Take regular college courses for credit on a part-time basis while still enrolled in junior or senior high school. This can be done during the school day on released time, and/or during late afternoons, evenings, Saturdays, and summers. No special provisions are made for the student. He or she simply registers, pays the usual fees, and does the work of the course. It is better not to point out to the instructor that the student is younger than the average of the class. Amazingly, instructors of college classes usually are not aware that a student who makes A's and seems brilliant is young, even though that person may be only 12 years old and quite short. For example, a highly experienced, middle-aged college math teacher called such a youth to her desk after the third class of a college algebra and trigonometry course and said to him, not "You seem young for this course," but instead "You seem overqualified for this course." He then signed up for her analytic geometry course, also, and was the best student in both classes. See Keating, Wiegand, and Fox (1974).

Taking college courses this way has many advantages that make it popular with SMPY's proteges and others:

- No special preparations are needed. No one has to organize a special class or find ways to finance special arrangements at school.

- Of course, parents must pay the required fees, but probably the credits earned can be used later to reduce time in college. Thus the expense can be considered advance payment of college tuition.

- Taking college courses early can provide orientation toward later fulltime college attendance, especially if the college attended is somewhat comparable in level to the subsequent institution. The less stringent the college at which courses are taken on a part-time basis, the earlier a student of a given ability level can do well there. Even though the college courses may not seem high-level enough for the student, still to him or her they may be preferable to the analogous high-school course.

  We at SMPY have, for example, seen a ten-year-old be the best student in an introductory computer science course at a state college. He was competing with seven of our youths who were older than he and with 12 adults. While still ten he began a second-level computer course in the Johns Hopkins summer session and made an "A" on it, also. Of course, this is a truly brilliant youth, with a Stanford-Binet IQ of 190, but he dramatically illustrates the fallacy of assuming that one must be of the usual college age in order to take a college course.

  Two other youths, one 12 and the other 13 years old (both of them eighth-graders), took the introductory computer science course with regular day students at Johns Hopkins and made A's. It can hardly be coincidental that both of them went on to be graduated from Johns Hopkins at age 17.

- Often, arrangements can be made to substitute certain college courses for the equivalent high-school ones. Also, some college courses such as computer science or economics may be acceptable as electives in high school, thereby hastening graduation. One of our youths took no mathematics below the college level beyond the first-year algebra in junior high school. During the summer after the eighth grade he made "B" in a college algebra and trigonometry course at Johns Hopkins. During each of the next four semesters of school he took a mathematics course at nearby Goucher College, thus completing a year of calculus and a course in linear algebra by the end of the tenth grade. Meanwhile, during each of the two summers he took two semesters of college chemistry at Goucher. In the fall after the tenth grade he became a full-time sophomore at

Johns Hopkins because of the 39 credits of college work he had earned from the last half of the eighth grade onward with all A's except for the one B in his first college math course. You will not be surprised to learn that he easily won his baccalaureate with distinction at age 17 in six semesters rather than the usual eight and went on to another great university to study for a Ph.D. degree in electrical engineering. Would you be surprised five or ten years hence to find that he is well embarked on an outstanding postdoctoral career?

9. Credit by examination is an excellent way to move ahead while avoiding repetitive course material. In high school or college one may be allowed to "challenge" courses--that is, to study for them privately and then take an examination. One may be able to get credit for college courses by means of the Advanced Placement Program (APP) examinations or the College Level Examination Program (CLEP) of the College Board. APP is especially useful for getting the first year of college calculus out of the way early. Many other first-year-of-college courses may also be waived, usually with credit, in the same way. If one does not go the APP or CLEP route, it may still be possible to get credit at the college one enters by taking departmental exams there, but this is a less reliable procedure than are the external exams. Much depends, however, on the college's policies regarding advanced standing.

We have seen a young, accelerated student earn 47 college credits by APP examinations in two years. This is the equivalent of 1.6 years of college, enabling the student to earn a degree in five or even four semesters. Two tenth-graders each earned 24 credits (80 percent of a year) by taking APP exams in such subjects as biology, calculus, chemistry, and physics. One of these scored high in two subjects he had not even studied formally, biology and chemistry! Also, credit outside of science and mathematics is common among the SMPY participants. Truly, APP exams are a wonderful opportunity to accelerate educationally and to save substantial or even large percentages of the costs of attending college. This may enable a student to attend a more expensive institution than his parents could afford otherwise.

Eager youths who are in the upper one-half of one percent of their age group nationally with respect to mathematical reasoning ability and who also have excellent general intelligence can readily enter college at age 15 or 16 with sophomore standing. Usually, they will be better off academically, and probably socially and emotionally also, for having done so, especially if during the first year or two they can commute to the college from home.

10. Taking correspondence courses at the high school or college level from a major university such as California or Wisconsin is a possibility, but it requires so much self-discipline from the student that we have not found it very satisfactory. Feedback from the homework-grader at the other end of the line comes too slowly for most youths. If this approach to acceleration is used, some suitable support system at home or school such as a mentor is needed, or else the student is likely to lose interest.

11. We at SMPY do not endorse the usual type of so-called self-paced instruction, including programmed instruction. In our experience, mathematically precocious youths work much more quickly and better when they are paced fast and at a high level of rigor by excellent instructors or mentors and, except for the one-to-one tutoring situation, by their equally able classmates. We have seen plane geometry take ten two-hour sessions in a fast-math class, one school year in a regular class, and considerably more than one school year by self-paced instruction. There are exceptions, of course. A few brilliant students prefer to work almost entirely on their own and do so effectively, but this is typical.

12. Some private elementary and secondary schools may have distinct academic social, or athletic advantages over public ones and may therefore be worth their substantial costs to parents who can afford them. We at SMPY are convinced, however, that they are no panacea for intellectually talented youths. The best of such schools often take care of the academic needs of youths with IQ's between about 120 and 140 well, but few of them have strong advantages over the better public schools for students brighter than that or with extremely high special aptitudes. Being small, they usually lack scheduling flexibility. Having an intimate atmosphere, they are often more resistant to the various kinds of educational acceleration than public

schools are. Sometimes they are not even as responsive to the pleas of parents on behalf of their intellectually talented children as public schools are.

Sending their brilliant child to a parochial or independent school does not free parents from the need to supplement the curriculum considerably. Each family must decide carefully whether, in terms of its total resources, the amount of money is better spent for private-school costs, or, instead, for educational supplementation and augmentation. It is important to have a clear agreement with the private school, in writing, as to what will actually be done for the child that will be decidedly superior to the opportunities of the best public school in which he or she might be enrolled. *Vague promises are not adequate.*

IN CONCLUSION

If some of the many strictures in this paper seem harsh, keep in mind how long overdue they are. There have never been many advocates of educational acceleration, whereas so-called enrichment has long dominated the gifted-child scene. When one considers how little objective support there is for the various and often nebulously defined activities called enrichment (see Daurio 1978 and Stanley 1976c) and how much there is for acceleration this seems bizarre. Among educators, educational psychologists, parents, and the general public matters of opinion are likely to overshadow those of fact, so perhaps resistance to acceleration is not surprising. At least and at last, however, educational acceleration deserves careful consideration on its own merits as a major set of ways to improve the education of the intellectually talented, rather than being derided or ignored.

Were our educational system not so wedded to the age-in-grade and Carnegie-unit lock-steps and if it catered far better to individual differences of all kinds in intellect, ameliorative programs such as SMPY's might not be needed. In a sense, they are stopgap procedures. Because there seems little hope for major changes in the structure of formal education in the foreseeable future, however, there is no likelihood that the dire need for many SMPY-type programs will disappear soon.

Two caveats are in order. First, it should be obvious that most of my experience with intellectually talented youths has been in the United States, and therefore my remarks are directed chiefly at coordinators of the education of gifted children and at their parents in this country. Educators and parents from other countries may find much in this paper that speaks to their condition, but they will realize the necessity for making the modifications that natural differences dictate.

Secondly, we at SMPY work almost exclusively with youths who reason exceptionally well mathematically, among the top 1 to 3 percent of their age groups nationally. Our findings and recommendations relate directly to them. We are far less confident that certain of our procedures are as applicable to youths whose intellectual talents are great but not in the area of mathematics, the mathematical sciences, and the physical sciences. Nevertheless, although all participants in our annual talent searches must exhibit mathematical aptitude equal to that of at least the top 1 in 33 of their age group, they are an excellent group from the standpoint of reading comprehension and knowledge of general vocabulary, too. Some of them are, indeed, far more gifted verbally than mathematically. Some (especially among the girls) who reason extremely well mathematically prefer the social sciences or the humanities. Because of this diversity of interest we have seen many types of response to the various ways to accelerate one's educational progress. These give us some confidence, as does the research literature, that educational acceleration is not useful merely for the mathematically and scientifically brilliant, but also for most other brilliant youths who crave it.

Mathematics is, however, a closed system that draws far less on life experiences than do the social sciences and humanities. One does not need to have lived, loved, suffered, and lost in order to understand algebra. Thus a high SAT-M score, accompanied by a moderately good SAT-V score, tells us rather reliably what subjects the student can probably learn earlier than most of his or her agemates.

We feel that this is also true of an exceptionally high SAT-V score. The SAT-V score seems to reflect fairly accurately the assimilation of life experiences in the verbal area that would be useful in a college course in the social sciences or humanities. We have seen some of our participants take economics, political science, sociology, psychology,

intensive Russian, and the like quite successfully at an early age. Specialists in the gifted need to explore various special-ability areas more fully.

So I leave you with the thought that educational acceleration is not the ogre educators and others have alleged. Instead, we at SMPY have found it to be *the* method of choice for those youths who reason extremely well mathematically and are eager to move ahead educationally. For other gifted children it should be a far-more-considered set of alternatives than at present. I invite you to examine the evidence closely and then to act accordingly.

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LET ME TELL YOU, G/C/T
(continued from page 35)

I understand through the Winter 77-78 Newsletter of the Gifted Child Society, Inc., that you have recently begun to publish a magazine for those concerned with the needs of gifted and talented youngsters. I'm interested in this area both as a parent of a gifted child and as a teacher in a nursery school. I am still amazed at the apathy, misconceptions, and downright hostility that greet an interest in appropriate education for these kids.

Barbara B. Ziek
Monroe, New York

I am hanging my head in shame. For some unknown reason, I failed to send you a check for a subscription to G/C/T. One is enclosed.

You are to be congratulated. I have seen a copy of your first issue and think it is excellent. Teachers who have received a copy feel as I do. I am enclosing a list of coordinators of programs for the gifted in Georgia. If you have not already done so, please send them information on the magazine.

I am enclosing a copy of a new publication from Georgia. Thought you might be interested. As with many publications, the beginning is tough but I believe it will survive.

Now for a bit of news from Georgia. Our General Assembly has just closed and never before have I seen such strong support for gifted as we had this year. Both the House and Senate passed a resolution publicly proclaiming their commitment to bettering programs for the gifted in the future. They also included in the Appropriation Bill a statement that makes it illegal for local school systems to diminish the number of special education teachers in the area of the gifted during the next fiscal year. It also provided for expansion of programming by funding 500 new special education units.

In addition to assuring us of teachers, the General Assembly earmarked $100,000 of the staff development money appropriated to be used for staff development for teachers of the gifted. Many of us feel that things are looking up for the gifted, especially in Georgia.

Margaret Bynum
Education Consultant
Program for Gifted
Atlanta, Georgia

That's wonderful news from Georgia. Margaret, who was the first state consultant for the gifted in the entire *United States, has done a remarkable job. Would that other states follow the Georgia lead!*

The magazine referred to is TipTop, *"written especially for young people by young writers and artists." For more information on* TipTop *write to them at 3700 Buford Highway NE, Number 38, Atlanta, GA 30329.* — G/C/T.

You are to be congratulated on the excellent articles in this issue. I thoroughly enjoyed reading them to the extent that I intended to give the magazine to other professional staff members to read. Unfortunately, this morning I discovered that the magazine had been misplaced.

Is it possible to purchase this single issue of your magazine, and, if so, please advise me of the cost of a single issue so that I may order it.

Joy P. Casadonte
Director of Personnel and School/Community Relations
Youngstown, New York

Copies of all back issues may be purchased for $2.50 each. — G/C/T.