

EDUCATIONAL PROGRAMS

AND

INTELLECTUAL PRODIGIES

Edited by Julian C. Stanley, William C. George, and Cecilia H. Solano

Supplement to

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The Study of Mathematically Precocious Youth

The Johns Hopkins University, Baltimore, Maryland 21218

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To those persons who greatly facilitate the education of intellectually talented students — with, of course, special thanks to Lewis Madison Terman (1877-1956), whose pioneering longitudinal study from 1921 to the present provides justification for such efforts.



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INTRODUCTION

BACKGROUND REMARKS

William C. George

On 6-7 November 1975 a symposium on intellectual talent recognizing the contributions of Lewis Madison Terman (1877-1956) was held at The Johns Hopkins University in Baltimore, Maryland. The organizer of the symposium, Professor Julian C. Stanley, felt that the time was appropriate to revive interest in the gifted child movement. In 1975 events on the national level and local awareness regarding the academically talented seemed favorable for that. In addition, 1975 was the year of the fiftieth anniversary of Terman's first published volume in his *Genetic Studies of Genius* series. A proceedings volume based on the symposium would appear 100 years after Terman's birth. There seemed to be no better way to bring the plight of this "disadvantaged" group (gifted children) to the public's eye than by holding a symposium honoring the "father of the gifted-child movement."

The symposium attracted approximately 400 educators interested in identifying gifted children and developing programs suited to their specific needs. Persons from all over the nation came to hear speeches about the historical background of the gifted-child movement (John C. Gowan), a report of the long-term follow-up of the women in Terman's longitudinal study of gifted children (Pauline S. Sears and Ann H. Barbee), the Study of Mathematically Precocious Youth (Julian C. Stanley), sex differences and intellectual precocity (Lynn H. Fox), creativity and its relationships to intellectual talent (William B. Michael), and various innovative programs for gifted and/or talented students that were in existence throughout the United States (James L. Bray, Elizabeth I. Kearney and Jane S. Brockie, Marshall P. Sanborn, and Albert J. Pra Sisto). In addition, parents, students, and educators came to discuss with a panel of sixteen mathematically talented youths the latter's views on educational acceleration.

This symposium resulted in a book called *The gifted and the creative: A fifty-year perspective*, edited by Julian C. Stanley, William C. George, and Cecilia H. Solano. It was published in the late fall of 1977 by The Johns Hopkins University Press, Baltimore, Maryland 21218. The authors included from the Terman Symposium in that volume are Gowan, Sears and Barbee, Stanley, Fox, Michael, and J. W. Getzels, who chaired the symposium. Two additional commissioned papers on creativity, not presented at the symposium, came from E. Paul Torrance and George S. Welsh. Phyllis B. Ohanian updated the last fifty years of her musically and artistically talented family, some of whom had been written up in volume 3 of *Genetic Studies of Genius* (1930).

Since the topics covered in the original symposium were so diverse, it was not possible to include all the presenters' papers in *The gifted and the creative* volume. The editors (Stanley, George, and Solano) felt, however, that those papers not included were timely and important and would supplement the book well. The enclosed group make up a *Supplement to The gifted and the creative: A fifty-year perspective*.

The supplement contains two main parts and should be read in conjunction with *The gifted and creative*. The first consists of a group of papers explaining five unique and innovative programs involved with improving the education of the gifted. Their authors are teachers (Finch and Pra Sisto), curriculum specialists (Brockie and Kearney), current or past program directors (Bray and Sanborn), and a social psychologist (Solano). The other section is a collection of short articles on prodigies. Their author (Montour) discusses the important concept of life success as it relates to the stereotypic attitudes of the general public.

In addition, two papers related to the symposium are not included in the volume or its supplement. Both are scheduled to appear in future issues of the *Gifted Child Quarterly*. The two references are as follows:

Albert, Robert S. 1978. Observations and suggestions regarding the gifted, their families, and the achievement of eminence. *Gifted Child Quarterly*, Vol. 22, No. 1, Spring.

Stark, Eugene W., and Stanley, Julian C. 1978. Bright youths dispel persistent myths about intellectual talent: Panel discussion with parents and educators. *Gifted Child Quarterly*, Vol. 22, No. 2, Summer.

REFERENCE

Burks, B. S., Jensen, D. W., and Terman, L. M. 1930. The promise of youth: Follow-up studies of a thousand gifted children. *Genetic studies of genius*, Vol. III. Stanford, Calif.: Stanford University Press.

**PROGRAMS FOR FACILITATING
INTELLECTUAL TALENT**

A STATEWIDE PROGRAM IN THE DISCOVERY AND GUIDANCE OF GIFTED STUDENTS

Marshall P. Sanborn

ABSTRACT

The Research and Guidance Laboratory was organized at the University of Wisconsin in 1957 to conduct longitudinal research-through-service activities with gifted and talented high school students. To date it has involved some 3,500 young people from 90 schools throughout the state. Each year faculties of cooperating schools use multiple criteria to select new ninth-grade participants. Selected students visit the Laboratory annually during high school for evaluation, testing, counseling and vocational-educational exploratory activities. Laboratory staff use clinical data obtained during these visits to write individual reports to schools concerning each student. Reports contain suggestions which local schools can use to improve educational opportunities. Each cooperating school is visited annually by a team of Laboratory staff. Parents of the students are consulted with, and teachers are engaged in in-service regarding gifted and talented students. Laboratory activities have generated many research questions concerning identification, guidance, and educational-vocational development of gifted and talented students. It is intended to continue follow-up of Laboratory participants for many years after they leave high school. In the meantime, principles and procedures developed with the gifted are being generalized to other target groups.

I wish some organization, identified in the public mind with concern for all American youth, would take some dramatic action to demonstrate a vigorous interest in the gifted boy and girl.

-James Bryant Conant

Some 20 years ago a small group of faculty and administrators at the University of Wisconsin-Madison took up the challenge expressed in the quotation above. The tangible result of their leadership and commitment is the Research and Guidance Laboratory, which this year marks its eighteenth year of continuous longitudinal research and service work with some 3,500 gifted and talented young people, their parents, and their teachers and counselors from 90 school systems throughout Wisconsin.

The Laboratory is a center for advanced study and development of procedures for education and guidance of the gifted and talented as they progress through high school and college and into adult citizenship. Its program is based on the tenet that the problem of identifying and providing for such students is basically an obligation of the local schools. The Laboratory attempts to stimulate and assist school faculties to develop effective local practices which meet this obligation. At the same time it carries on research on methods of discovery and development of youth of superior promise in any field. By means of a research-through-service format, the Laboratory attempts to demonstrate what a joint attack by the University, public schools, parents, and community members can accomplish in the conservation and development of human resources.

The Laboratory began operations in 1957 as a small cooperative project of the School of Education and the College of Engineering. In 1959 it became an officially recognized agency of the University of Wisconsin, with interest and support of the College of Engineering, School of Education, College of Letters and Science, and University Extension. In that year President C. A. Elvehjem, in accordance with a request from the Faculty Administrative Committee, appointed a standing advisory committee for the Laboratory.¹ In the years since 1959 both financial support and advisory functions have also been contributed at various times by the Medical School, College of Agriculture and Life Sciences, Law School, School of Business, Graduate School, and the University Center System. Thus the development of the Research and Guidance Laboratory has been a University-wide effort, with leadership and financial support coming from every major instructional unit of the Madison campus.

In 1968 the Dean of various units contributing financial support to the Laboratory on a year-to-year basis decided to arrange for permanent funding. The Laboratory now is a budgeted unit of the School of Education and is housed in the new Research and Development Center for Cognitive Learning on the Madison campus.

University funding of the Laboratory has been supplemented from time to time by some \$350,000 in extramural grants. Participating school districts also pay annual fees which cover about 20% of the costs of operating the program. Taken together, the various sources of support for the Laboratory reflect a widespread and durable interest in gifted and talented boys and girls.

STAFF

The Laboratory is staffed by two members of the School of Education faculty and about twelve research assistants, all of whom are advanced graduate students in the Department of Counseling and Guidance. Primary leadership during developmental years came from Professor John W. M. Rothney, now retired. He was Director of the Laboratory from 1957 to 1968. His concept of the research-through service format and his disciplined approach to research and development of principles and procedures in identification and guidance of the gifted are heavily reflected in current Laboratory practice. In early years Dr. Rothney was assisted by C. M. Brown (College of Engineering) and G. W. Burchill (School of Education). He was joined in 1963 by M. P. Sanborn, who assumed directorship from 1968-1973. Since 1973 the Director has been Charles J. Pulvino. Professor Ray E. Hosford, presently of the University of California-Santa Barbara, was a valued member of the staff during the 1966-1970 period.

About 100 graduate students have held assistantships in the Laboratory during their Ph.D. studies. Many of these persons are now significant leaders in education. They are engaged in teacher and counselor training programs and in public school work in nearly every state.

PROGRAM

Most school systems that have cooperated in the Laboratory have been those which responded to an announcement in a bulletin of the state department of public instruction to the effect that the University would work with schools in experimentation and research on the discovery and guidance of gifted and talented students. Cooperating schools have provided an excellent cross section of Wisconsin systems, ranging in size from those with

¹Original advisory committee members were Professors C. M. Brown (Engineering), J. W. M. Rothney (Education), C. A. Wedemeyer (Extension), and Deans K. F. Wendt (Engineering), M. H. Ingraham (Letters & Science), and Lindley Stiles (Education).

fewer than 20 teachers to those with several hundred. They are located in all parts of the state and show great variety in terms of staff, facilities, and school environment. This distribution is significant in view of the fact that most previous studies of gifted and talented students have been carried out in large school systems; bright youngsters in small schools and remote settings have received little attention. Students have been brought annually to the Madison campus from some communities more than 250 miles distant, with schools providing travel expenses for them and for staff members who accompany them.

Faculties of cooperating schools select ninth-grade students on the basis of multiple criteria developed by the Laboratory staff. Directions given to cooperating school staffs are as follows:

IDENTIFYING GIFTED AND TALENTED STUDENTS

Traditionally, the identification of gifted and talented students has been done by administering an objectively scored test or battery of tests, setting an arbitrary cutoff point, and declaring that those students whose scores lie above that point were superior, talented, gifted, or even geniuses. The use of this procedure fails to give consideration to the fact that superiority can be exhibited in other ways than on tests, and that tests can provide only relatively short and limited samples of achievement in highly structured situations. It also fails to consider the fact that teachers who have worked on identification of gifted and talented students are more likely to recognize and respond to the special challenges they discover during the identification process.

Despite what has been written about inadequacies of teacher judgments in identifying gifted and talented students, there is considerable evidence to indicate that if they are given some instruction about what to look for and provided with some cautions about avoiding common errors, they can do the task very effectively. No procedure is perfect, and some students are likely to be overlooked under any system; but a procedure using the criteria below has the merit of looking at students from several angles rather than depending on short and limited samples that the use of tests alone provides.

When teachers are to become involved in identification of gifted and talented students, guidelines similar to the following may be utilized. Teachers may be reminded that a gifted or talented student may not necessarily meet *all* the following criteria, but he/she will usually meet some combination of them:

1. Uses large vocabulary easily and accurately.
2. Is effective in spoken and written communication.
3. Has a rich reading background, and shows evidence that he thinks about his reading and likes to discuss it.
4. Shows a wide range of interests, or in exceptional cases a heavy concentration on one.
5. Spends time beyond usual assignments or schedules on things that interest him.
6. Spends much time on special projects of his own.
7. Performs significantly above grade level in school projects.
8. *Usually* scores high on standardized tests.
9. *Usually* receives good marks in school classes.
10. Tends to figure out what is wrong with an activity and show how it could be done better.
11. Gives refreshing twists to even old ideas.
12. Shows little patience with routine procedures and skills.
13. Asks penetrating questions, particularly about causes and reasons.
14. Likes to seek answers to problems and puzzles.
15. Is quick to recognize relationships.

There is always the risk of overlooking the nonconforming student or the very bright student who does not perform at a high level in classes. It has been observed that as teachers become more aware of this possible difficulty, they tend to nominate such students and provide comments in defense of their nominations. They may indicate that they have evidence that one of their students is a superior learner even though the school has not reached him. It is possible also to recognize a highly creative student or one who performs at an exceptionally high level in only one area; but again, as teachers become more aware of these difficulties they are less likely to overlook such students.

Schools develop their own procedures for utilizing the criteria listed above. Procedures used have resulted in a group of participants whose average mental test scores are in the upper 3 to 5 percent of students in their age range

and grade in school. There is, of course, systematic variance on such criteria as mental test performance, depending upon characteristics of local school populations from which participants are drawn. It is assumed, however, that in every school there are some students whose potentialities warrant special attention and programming which the school can develop and provide.

The function of the Laboratory is to serve as a demonstration and development center for counseling, guidance, and education planning activities. The students who participate from each school receive direct benefits of these activities, while at the same time the school is aided in supplementing and augmenting existing programs, or in inaugurating new procedures and services which will better meet needs of gifted and talented students.

Laboratory activities involve specific goals for students, parents, and schools:

1. Selected students come to Laboratory facilities for one-day visits at least once a year during their period of high school attendance. A full day of activities is arranged for them, including testing and evaluation, analysis of written and oral performances, visits to classes and laboratories, and conferences with University staff members in any area of interest. These procedures are designed to
 - a. broaden their horizons with respect to educational and vocational opportunities,
 - b. develop realistic self-concepts about their strengths and interests,
 - c. foster plans for suitable educational programs,
 - d. discover methods for overcoming limitations,
 - e. encourage development of personal and academic strengths, and
 - f. provide counsel on any matter which may influence development of the individual student.

Findings are interpreted to the students, and the implications are considered in individual counseling sessions. Highly individualized adaptations to particular characteristics and needs are emphasized throughout.
2. Students' visits to the Laboratory are followed closely by visits of Laboratory staff teams to schools they attend. At the schools, conferences are held with parents of each participating student. Laboratory findings are interpreted to the parents and supplemented by information parents give. Suggestions are made to parents regarding ways they may facilitate their child's growth. These conferences are designed to
 - a. inform parents about characteristics of their children that they may not know,
 - b. stimulate action of parents to meet developmental needs their child shows,
 - c. facilitate communication between the parents, the school, and the student, and
 - d. discover points of view and other parental characteristics which affect the student's development.
3. On the basis of activities and performances at the Laboratory, a written report regarding each individual student is sent to the school he/she attends. These reports have been received and circulated among the teachers prior to the visit in the school by the Laboratory staff. Ordinarily the reports contain information about the student's performance, interests, and needs, together with suggestions the school may implement to provide desired educational or personal experiences. After parent conferences are completed a teacher's meeting or in-service training program is held. Specific students and suggestions to the school are discussed, and general principles for guidance and education of gifted and talented students are emphasized. Usually by means of the case approach, attempts are made to solve problems encountered in educating such students. Objectives of these training sessions are
 - a. stimulation of and assistance with the processes of identification of gifted and talented students,
 - b. encouragement and assistance in making special provisions for development of gifted and talented students and stimulation to do so for other students,
 - c. provision of information about educational and vocational requirements and opportunities particularly applicable to gifted and talented students,
 - d. encouragement of innovation and experimentation in school procedures for gifted and talented students as well as for other students, and
 - e. demonstration of appropriate guidance services.
4. After their graduation from high school the participants are followed by the Laboratory through post-high-school education and on into their careers. The intention is to continue this follow-up process for many years. Contact with graduates has thus far been principally by means of questionnaires, but other forms of contact have been employed for certain purposes. About one-half of the participants are interviewed during their first

year after high school. Smaller proportions are interviewed during later years, the number and frequency being dependent on specific research goals.

During early post-high-school years the participants make many requests of the Laboratory for information and assistance in relation to admission to undergraduate, graduate, and professional education programs. Some return for counseling regarding vocational goals or personal matters. These contacts, however, are entirely voluntary. For those who have graduated from high school, service is limited to such matters as are requested by them, and to occasional small publications sent to them containing follow-up research data.

RESEARCH AND EVALUATION

More than 100 research projects on the gifted and talented have been completed at the Laboratory. Efforts have been focused primarily on identifying characteristics of gifted and talented students, on developing methods for working with such students in school, and on questions related to educational and vocational development of the gifted and talented. Research cited in this section is representative only of studies which yielded data on effects of the Laboratory program on students, parents, and school practices.

Laboratory policy places certain constraints on research which bear comment here. The Laboratory is a research-through-service program with at least as much emphasis given to service as to research. In the hierarchy of priorities the student comes first. No activity is undertaken unless it can be justified in terms of its potential value to participating students. When students come to the Laboratory they are told that the activities they take part in are to help them learn more about themselves and their environment, and to assist them in discovering opportunities and making choices important to themselves. If an activity does not appear useful to these goals, it is not instigated; and if, over time, an activity does not prove useful, it is not sustained. Except for follow-up studies, any data obtained at the Laboratory are obtained within the limits of this policy.

The inadequacies of control groups for use in research of the nature done at the Laboratory has been discussed thoroughly by Rothney and Lewis (1969). In spite of these inadequacies we have attempted some comparisons between Laboratory participants and youngsters who were "matched" on academic, familial, school, and community variables. Members of the comparison groups involved in most studies were identified from among entering freshman classes at the University of Wisconsin. As such, these students fall short of being fully representative of the same populations as Laboratory participants, since a few Laboratory students did not enroll in college and many did not enroll at the University of Wisconsin. In a few instances other comparison groups were identified. By and large, however, we have not become involved in research using explicit "treatment" and "no treatment" or "placebo" groups.

In some instances, two or more procedures for accomplishing a particular guidance or educational goal have been compared for effectiveness. In all such research we have employed with every student a procedure actually designed to serve the goal. Generally speaking, research of this kind has been to compare one or more newly devised procedures against an existing Laboratory practice, the motive being to discover improvements in techniques for accomplishing given goals. In all cases, the goals we have in mind were to further the development of the student, and in no case is work toward the goal withheld from participants for the sake of establishing a control group.

The Laboratory population. Selection procedures employed by cooperating schools have resulted in a population of student participants who show a variety of performances, activities, interests and career development patterns. Although they may be relatively homogeneous in gross terms such as distribution of school and college grades or scores on ordinary mental tests (Fredrickson and Rothney, 1972; pp. 79-89), use of procedures designed specifically for study of gifted and talented persons has revealed a group that can best be described as highly heterogeneous. Experience in direct interviewing, longitudinal casework, and follow-up has illustrated that individual uniqueness often defies classification, and classification often obscures uniqueness (Sanborn, Pulvino, and Wunderlin, 1971; p. 49). While it is possible to make some broad generalization about what Laboratory participants are like, this can be done only with due attention to the fact that for any generalization which can be made, important exceptions can usually be noted.

Scores of the Laboratory participants cluster around the 95th percentile on most tests, with averages being at about the 97th percentile (Rothney and Sanborn, 1966). Furthermore, the students tend to perform evenly across a variety of verbal, quantitative, and reasoning tasks, with sharp profiles of performance either on tests or in

academic subjects being relatively rare (Fredrickson and Rothney, 1972; p. 80-81). Only with use of the Concept Mastery Test (Terman, 1939) and the verbal and quantitative sections of the Wisconsin Inventory for Talented Students has it been possible to obtain wide ranges of performance. Among 1,410 students who completed the Concept Mastery Test in grade 12, for example, scores ranged from 26 - 174 ($\bar{X} = 73$; $SD = 26$). On the Wisconsin Inventory for Talented Students it has been possible to show sharp differences in verbal and quantitative performance. Such differences, however, have not been common.

Results of several studies have indicated that scores on ordinary standardized tests have very limited value for guidance work with gifted and talented students. Most tests have "ceilings" too low to assess top performances, and they yield very poor predictive information (e.g., Alexakos, 1966; Bradley and Sanborn, 1971; Rothney, 1963). Also most tests focus on mental products and give little or no attention to processes whereby those products are achieved. Two separate studies at the Laboratory have produced data which demonstrate that when gifted and talented students are freed from usual test routines and given latitude of response, and when their reasoning as well as their conclusions are analyzed, exciting and unique qualities of ordering and insight come to light (Cody and Rothney, 1963; Rothney and Sanborn, 1965).

Contrary to the "egghead" stereotype often applies to the gifted, Laboratory data reveal a group of young people who display during high school and later years a rich pattern of involvement in a wide variety of activities. A summary of high school activities of 350 boys and girls (Hoyt and Hebel, 1975; p. 110-113) and a follow-up of 497 students who were four years beyond high school graduation (Lewis, Bradley and Rothney, 1969) both demonstrate that the Laboratory group has achieved high levels in academic, athletic, religious, political, social, and creative pursuits. In high school, for example, about 67% of the males and 33% of the females were on one or more varsity interscholastic athletics teams. This proportion of involvement far exceeds the proportion of all high school students who are on varsity teams.

Follow-up studies of Laboratory participants indicate that they make very remarkable scholastic and career progress. Alexakos and Rothney (1967) compared post-high school education and career progress patterns of 214 participants to those of a matched group of university students who did not participate in the Laboratory. Two and three years after high school the Laboratory group had shown more persistence in higher education, received more financial aid for college, and occupied more honorary and leadership positions. They also differed on reasons for dropping out or not attending college, plans to enter higher education (if not already involved), and long-range plans. Later study has indicated that about 78 per cent of the Laboratory participants go on to graduate or professional education after their baccalaureate degrees. About 50% of the males and about 25% of the females do so within 7 years of high school graduation.

A small 10-year follow-up study by Hartz (1973) provided information on 30 men and 30 women who graduated from high school in 1963. Subjects of his study were selected so as to provide a matched sample for comparison with gifted persons who graduated from high school in 1951. Although his comparisons are not of interest here, some facts concerning the 1963 graduates are. Among this group all the subjects had completed baccalaureate degrees. The number of women who had completed either a graduate degree or a degree in law or medicine exceeded the number of men (16 and 14, respectively). Twelve women and 20 men were engaged in professional and managerial occupations. Twelve women listed "homemaker" as their occupation. Six women and 10 men were engaged in sales, clerical, and service occupations. About 75% of the subjects were married, but 35% of them reported having no children and only 1 person reported having more than 2 children. Both males and females reported satisfaction with their current status. None expressed extreme dissatisfaction, and only 1 woman and 2 men reported moderate dissatisfaction.

When asked to state what factors were important in their successes and satisfactions, about half the subjects mentioned personal qualities (e.g., adaptability, optimistic outlook, ability to get along with others) as major factors. About 25% listed skills and competencies. Only 1 male and no females listed previous training as a major factor. When asked to state what factors they felt were major handicaps to them in achieving their own goals, again they most commonly listed personal qualities (e.g., lack of self-confidence, bad temper, too easy-going).

This group of subjects appeared to be highly effective in their career development, satisfied, and optimistic about the future. A majority of the males and females (87% and 79%, respectively) felt that the future would work out well for them. About half of them believed that if they could do as they pleased 5 years hence, they would continue to do

as they were at the time of the study.

Descriptive studies such as those cited above, together with practical experiences with the Laboratory population, support the generalization that as a group these are active, versatile, able, and effective young persons. They show multiple interests and abilities, and they become involved in a wide variety of physical, mental, social, and solitary pursuits. They aim for long-training careers, and they succeed in higher education. They look inside themselves for major factors which aid or hinder their development. As a group also they are personable, sensitive to the problems and goals of others, and socially involved. There are exceptions, of course, but no Laboratory evidence indicates that these exceptions occur systematically according to special abilities of the individual.

Working with parents. As a matter of routine an annual conference with parents of each Laboratory participant is scheduled within a few weeks after the student's visit to the Laboratory. The objectives of these parent conferences have already been discussed. Five studies have been completed to determine effects of parent conferences and implications for work with parents of gifted youngsters.

Mueller and Rothney (1960) secured opinions of 9th grade students, their parents, and their teachers to determine the extent of mutual understanding among student-teacher-parent groups regarding the students. Results showed that students underestimated parents' opinions about them, and were actually more aware of teachers' opinions than those of their parents. Implications were for increased counselor activity with parents, teachers, and students aimed at improving interpersonal understanding among principal persons in the student's life.

A study by Hays and Rothney (1961) also supported the need for systematic parent-teacher-student contacts. They analyzed intrafamily relationships to discover how often parents left educational decisions to their children. Types of decisions of concern were those dealing with enrichment, acceleration, ability grouping, post-high-school planning and leadership. It was clear that parents — particularly fathers — would rather make choices than leave them to their children. There was agreement among families on only about one-third of all educational issues included in the survey.

Two studies were done to determine effects of parent conferences. Jessell and Rothney (1965) discovered what actions were taken by parents on the basis of suggestions made to them by Laboratory counselors. Later Camp and Rothney (1970) completed a similar study. The two investigations involved a total of 193 sets of parents whose children attended the Laboratory during the 1959-1969 period. Suggestions made by the counselors were generally to stimulate action in development of independent learning, career exploration, improving learning habits, participating in non-class activities, changing school course patterns, planning for education beyond high school, and in some cases such measures as acceleration or early admission to higher education. Parental reports of action taken were cross-checked by examination of independent reports of their children. Results of both studies indicated that highly specific suggestions based on individual knowledge of the child were effective in leading to parental follow-through.

Henjum and Rothney (1969) compared actions taken by parents of Laboratory participants with those taken by parents of gifted children who were not associated with the program. The parents who had discussed their children annually with the Laboratory counselors took more active roles in their children's career planning than did parents in the comparison group. In both groups the parents with higher education backgrounds were active in post-high-school educational planning of their children. Non-college parents tended to rely heavily on school and Laboratory personnel for educational and career guidance. This study confirmed other findings that parental action was likely when suggestions made were highly specific and individualized.

Practical experiences with parents indicate that they value the annual conferences. Over the entire period of Laboratory operations some 10,000 parent conferences have been scheduled. In more than 95% of the cases, one or both parents have attended. Inasmuch as virtually all parent conferences are scheduled during regular workdays, the very high rate of attendance by both parents (about 67%), sometimes both of whom have jobs, seems significant. In cases where families of Laboratory participants move out of a cooperating school district or out of the state, parents often make special arrangements for their children to continue in the program. They have transported their children from as far away as Pennsylvania so that they could attend Laboratory activities throughout high school.

Stimulating change in schools. No adequate program of education for unusual students can be accomplished

without unusual provisions. We know this insofar as the mentally, emotionally, and physically disabled are concerned. Provisions for these students go beyond ordinary curriculum and grouping procedures. The same ought to be true for students whose interests and capabilities exceed those of the general population; but in a broad sense it appears that the principle, though often stated, has infrequently been put into practice. In 1964 the Laboratory surveyed all Wisconsin secondary schools to determine the extent to which 18 specific types of activities for gifted and talented students were being implemented. Results indicate that individualized procedures had been implemented in less than 25% of the schools and with only a fraction of 1% of the students. Group programs were most often implemented, but in no case in more than 48% of the schools (Rothney and Sanborn, 1968).

It has been revealing to examine different points of view as to why unusual procedures are not more often attempted. When administrators were asked to give reasons (Hoedt and Rothney, 1963) they said that teachers did not have skills and competencies required to make such provisions. When teachers were asked (Vandewater, 1963) they said such provisions were impossible because of lack of time, facilities, and school resources. The Laboratory has consistently worked to promote special programs and provisions in local schools, using local staff and resources. It has been possible to document marginal success in this endeavor.

Fredrickson (1968) compared 40 matched secondary schools on implementation of recommended classroom practices for gifted students. Twenty schools were cooperating in the Laboratory and 20 were not. Laboratory schools were implementing more provisions. The study indicated that teachers may need special in-service training focused on how to accomplish provisions for the gifted in their classrooms. Data obtained by Peterson and Sanborn (1972) supported this implication. They found that teachers who had been trained in highly-structured small group sessions, where the focus was on how to implement a special provision, were more likely to succeed in implementing the procedure than were teachers trained by less directive means. Specific practices often carried out in Laboratory schools have been listed by Fredrickson and Rothney (1968), Rothney (1966), and Rothney and Sanborn (1967). Review of a variety of unpublished studies concerning special provisions are available in Sanborn, Pulvino, and Wunderlin (1971).

Some evidence has accrued to demonstrate that when students themselves are aware of suggestions for special provisions in their schools, action is more likely to follow than when the suggestions are considered only by the school staff. Brahe (1970) investigated the extent to which students would interact with their teachers on specific recommendations given by Laboratory counselors. Students received letters which described recommendations the Laboratory had made to their teachers, together with instructions and encouragement for each student to take responsibility for initiating action on the recommendations. Results indicated that follow-through action could be increased from about 50% to 75% by this method. Davis and Sanborn (1973) compared four methods of communicating Laboratory suggestions to schools. Two methods involved teachers and/or parents only, and two involved the students. Communications involving students were the most effective, and a method involving personal follow-up interviews to determine students' progress in initiating action was far superior to the others in terms of actions later taken. Smaby and Sanborn (1971) demonstrated that joint planning with students at the time suggestions to schools are being formulated, utilizing examples of special provisions made in other schools, led to better school follow-through. In this case the students actually assisted in devising suggestions to their teachers regarding how to meet their own educational needs.

Both research and practical experiences at the Laboratory support the belief that where open communication systems can be devised, and where parents, teachers, counselors, and the students themselves work together in developing special provisions for the gifted, implementation in the school program is likely to follow. This appears to be true both in systems with large faculties and rich resources and also in small schools where personnel and resources are limited.

The Laboratory impact on students. The fact that Laboratory participants have surpassed a matched comparison group on certain post-high-school progress criteria has already been discussed (Alexakos and Rothney, 1967). Research concerning parental and school provisions stimulated by Laboratory activities has also been presented. Beyond these kinds of evidence there have been a few studies done to evaluate specific aspects of the program in terms of impact on students.

One topic of interest to several researchers has been the personal, social, and academic effects of various forms of acceleration. Brahe (1967) studied 33 students who left high school early and went on to college. Parents, school

personnel, and the students themselves furnished information regarding the value of acceleration for the individuals involved. In a related study, Kovan (1966) compared progress patterns and self reports of 26 of these accelerates who attended the University of Wisconsin with a matched comparison group who completed high school in normal fashion. Both studies demonstrated strong personal, social, and academic benefits to the students who were accelerated. Although both accelerates and comparison subjects established very good scholastic records in college, accelerates were superior. Their grades were higher and they reported fewer academic difficulties. Activity participation and social satisfaction were comparable in the two groups. Accelerates received more financial aid. Testimony of the subjects and their parents concerning personal and social benefits of acceleration tended to discount some of the common arguments against the practice.

During the 1964-65 academic year, 46 high school students were enrolled part time in 14 Wisconsin colleges to take advanced courses while still in high school. Hogan (1966) surveyed these students and their college instructors to discover whether this form of acceleration was fruitful. The subjects completed 99 courses in 10 subject areas under 72 instructors. About 95% of all grades received were A or B, and the instructors ranked these students in the top 10% of the class 69% of the time. The instructors also rated the students' personal and social maturity levels as equal to other college students. Oddly enough, high schools often would not allow credit for college courses completed, even though they were in subject areas offered by the high school.

A number of other small studies have been done to evaluate some specific Laboratory procedure. Koeppe and Rothney (1963), for example, determined effects of a one-day Laboratory visitation on classroom and study behaviors of 9th graders. Sanborn and Niemiec (1971) tested a procedure for identifying value hierarchies of graduating seniors, and McMahon (1973) determined the extent to which those values remained stable after 7 years. Atkinson (1971) experimented with behavior modification techniques in efforts to stimulate action on guidance goals, and he later cooperated with Peterson and Sanborn (1971) to determine effects of a class visitation procedure on students' concepts of higher education. By and large these studies have produced evidence regarding immediate outcomes of Laboratory procedures. Long-range outcomes can only be inferred from gross data such as those furnished by Alexakos and Rothney (1967) or Lewis, Bradley, and Rothney (1969).

At the end of the day during the last visit of high school seniors to the Laboratory they are asked to write a brief statement about their reactions to experiences in the program. In response to this assignment the students provide a great variety of positive and negative comments. Perhaps the quotation below, written in 1967 by a senior girl from Fort Atkinson, Wisconsin, represents comments given by hundreds who have completed the program:

"I am getting writer's cramp so I'll make this brief. The Lab has been a wonderful experience, and a big help to me. Most of the time high school is a busy schedule of places to go and things to do. The Lab gave me one day a year just to concentrate on myself. The classroom visits and interviews with professionals were fascinating. I also appreciated the chance to talk about myself in relation to school and family, which seldom occurs otherwise.

This is really a great thing you have going, and although I often feel as though I don't really belong here, I am honored that I was considered and accepted."

NEW DIRECTIONS

Although the past focus of the Laboratory has always been exclusively on the gifted and talented, current activities involve other target groups. Student appraisal, guidance and counseling concepts, and procedures developed and tested with gifted and talented youngsters appear to have promise for work with more general student populations. While the Laboratory is continuing to maintain its work with gifted and talented students from a small group of cooperating schools, it is also developing research and demonstration activities organized around broader counseling and guidance program goals in other institutions. Such matters as research, development of instruments and procedures, demonstration of such procedures in actual practice, staff training, evaluation, and follow-up are all areas in which the Laboratory attempts to assist schools.

Thus it is hoped to derive more general profit from experiences gained through years of intensive work with the gifted and talented. This work has provided us with many examples of feasible ways to capitalize on local potentialities, and to work together — students, parents, teachers, counselors and community — in better

understanding and meeting the guidance needs of all youth.

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EDUCATING GIFTED CHILDREN IN CALIFORNIA

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ABSTRACT

Educational programs for gifted children have been a part of the educational scheme in California since Lewis Terman began his study in 1921. As a result of that study, Pasadena instituted programs as early as 1926, and by 1951 districts such as San Diego and Los Angeles had established comprehensive curriculums.

State interest began in 1955 when the State Department of Education expressed a concern for this minority. The legislative body sponsored a three-year study from 1957 to 1960. As a result of that study, monies were appropriated to support a categorical aid program.

Funding has been at a minimal level since that date, but the state now provides a Gifted and Talented Management Team to work with participating districts. As a consequence of state and local interest, foundation monies, and innovative staff coupled with supportive parent groups, California's programs have served as pilots for many educational changes. Also, the funding has provided "seed" money for curriculum research and implementation.

MEETING THE NEEDS OF GIFTED CHILDREN

Lip service has been given to the concept of providing for individual differences, and giant strides have been taken to insure that the concept is implemented for the disadvantaged and for the minority child in our nation's public schools. According to Dr. Harold Lyons (former Director of the Gifted and Talented, Office of Education, Health, Education and Welfare), the United States Office of Education in 1969-1970 conducted a national survey and found that a little over 57% of the responding administrators indicated that there were "no gifted children" enrolled in their schools. Obviously, many students were going unnoticed because their needs were not recognized. Yet, many educators feel as does the staff of the California State Department of Education (1975, p. 5) that "the emergence and development of talent cannot be left to chance."

This interest on the part of California's educators is not a new one, for gifted programs under various names have existed in the state since Lewis Terman of Stanford University began his study of the gifted in 1921. Approximately 1500 California children with I.Q.'s of at least 135 were found, and the school districts in which they resided were jolted into a new awareness of the potential pool of talent available to society.

EARLY PROGRAMS

Shortly after Terman began his study, some districts in the state began to take steps to provide programs that were designed to meet the needs of these children. For example, in Pasadena, California, classes were initiated for such students, and as parental interest increased, Grant School was established as the receiving school for the gifted and talented youth in the community. Grant continued to serve the community in this capacity for approximately twenty years.

Interestingly enough, the teachers selected to serve this newly identified population had the following goals, which are similar to the ones set forth today (California State Department of Education 1971):

1. Provide independent working periods.
2. Expose the students to large bodies of knowledge and facts.
3. Provide performance-based instruction until grade level, or higher, if proficiency is demonstrated.
4. Give the child ample opportunity to interact in school situations with adults who recognize that the gifted child sometimes requires more freedom, less control, and more time to make discoveries than many of his age peers.
5. Set fewer grade (or quantitative) boundaries on work loads.
6. Establish assessment procedures that will reveal the unique talents of each student.
7. Design programs to enhance this uniqueness and/or to overcome the individual's weaknesses if they are fundamental to successful performance.
8. Provide the students with specific "how to" skills that are needed for economical mastery of knowledge and production. For example,
 - a. how to use library systems to aid research,
 - b. how to type,
 - c. how to scan and (later) speed read,
 - d. how to outline, abstract, and synthesize,
 - e. how to use simple computer language and do simple programming,
 - f. how to use basic and vernacular vocabulary of the special disciplines in which one is interested, and
 - g. how to classify experiences as a basis for primitive organizational structures.

According to Miss Celia Johnson, one of the first teachers in Pasadena to work with a class of identified gifted, the intent of the present program is very similar to the intent of the one in which she worked in 1926. In a letter to the writers (E. I. K. and J. S. B.) dated April 10, 1974, Miss Johnson (who has retired and now lives in Ojai, California) set forth some of the background of this early program.

"...in 1926, Miss Grace Ball, an elementary supervisor, persuaded the Board to allow her to establish an experimental class for the gifted.... Miss Pearson was the teacher, and the class started in a bungalow in the Madison District, I think. The class was small, but ranged from third grade through sixth. The children were so happy and the parents endorsed the plan enthusiastically. So, the following year, provisions were made for grades first through sixth. I was asked to take the primary department, and we opened in the old John Muir High School building (later demolished) on Walnut Street."

The program to which Miss Johnson refers was later moved to Grant School, and it continued to serve the district's gifted population until 1943.

EDUCATIONAL RESEARCH

Although the concern for this important segment of our educational community has continued since 1926, it has

not always had a high priority in the educational community. Luckily, many educators have continued to be concerned about meeting the individual needs of all students, and efforts were made to identify the characteristics of this population. For many years educators had to depend upon works such as Terman's *Genetic Studies of Genius* when they sought to identify the characteristics of the gifted. Then Dr. Richmond Barbour (1972), Associate Superintendent of Schools in the San Diego City Unified School District, decided that he would do a longitudinal study using 3,800 identified gifted. He found that the majority of the mentally gifted minors (MGMs) studied had the following characteristics:

1. good vocabularies,
2. superior ability to draw generalizations,
3. fine memories,
4. a sensitivity to strain and a possibility of serious emotional problems,
5. a need for some type of mental health counseling between kindergarten and twelfth grade. Given help they respond more rapidly than the average child.
6. a high degree of creativity which they learn early to conceal,
7. a need to work at their own pace,
8. almost total recall (some were, however, overly methodical),
9. the need to appear average (this was particularly true of children from the ghetto areas),
10. a need to learn, to question, and to ask reasonable questions at an unreasonable rate,
11. a tendency to set personal goals too high and then become frustrated when they can't be met,
12. the feeling that they are different — maybe even inferior, OR
13. the feeling that they are superior and can't be bothered by such trivia as facts,
14. a need to be in classes where they cannot get by with cursory work,
15. a hatred for routine assignments and requirements,
16. poor penmanship,
17. the ability to be good leaders,
18. a tendency to be loners for at least part of the time,
19. a great sense of humor — love to joke, pun, and wisecrack,
20. little interest in sports except in the individual ones,
21. a dislike for physical education classes (often they receive their lowest grades in that area), and
22. a tendency to be critical of teachers — particularly the rigid and inflexible ones whom they take a delight in "showing up."

Students such as those described above were fortunate when cities such as San Diego and Los Angeles established well-thought-out and comprehensive programs for gifted children and youth in 1951. In 1955, when the California State Department of Education began to show an interest in the gifted and express a concern for them, the foundation for the state program was laid.

The Legislature of California sponsored a three-year study from 1957 to 1960 (California S.D.E., 1975, p. 3). This study, "Educational Programs for Gifted Pupils," evaluated 17 different kinds of programs and 929 participating pupils and set forth the following conclusions:

"...the special provisions made in this program were beneficial for the gifted ... participating pupils make striking gains in achievement with accompanying personal and social benefits."

As a result of this study, the committee involved recommended that the state provide \$200 for operational expenses per pupil and \$40 for the initial identification costs.

LEGISLATIVE ACTION

In 1961, the recommendations of the committee referred to above were taken into consideration by the legislators, and Assembly Bill 361 was drafted and passed. It provided only \$40 per pupil for program and identification costs. Unfortunately, the average district expended nearly \$90 per pupil for identification, and in-depth studies revealed that program costs for special classes, counseling, and tutoring exceeded \$200 per child. Despite the gap between the amount expended and the amount allocated, the districts within the state were

encouraged because the funding indicated an increased concern for the needs of this previously legislatively ignored minority group.

The state interest in the program and in the needs of the children involved continued to grow, and in 1962 the State Department of Education hired two full-time consultants to work in the mentally gifted minors program. It was the responsibility of these two persons to work with participating districts to upgrade and develop programs and with non-participating districts interested in learning more about the program and ways of entering it. The number of consultants remained the same into 1975; however, there was an expansion of the team to include a director, a consultant for Northern California, and a consultant for Southern California.

In 1963, the State Department of Education for California received an award of \$249,000 from the Cooperative Research Branch of the United States Office of Education. The monies were provided to aid in the development and demonstration of special program prototypes for gifted students in California. A model demonstration center was established in each of six school districts, and materials and curriculums were prepared to aid educators interested in providing enrichment, acceleration, special classes, and counseling programs for the identified gifted within their districts. This research program was entitled "Project Talent" and ran from 1963 to 1966. The participating districts were Lompoc Unified, Los Angeles Unified, and Pasadena Unified in Southern California, and Davis Joint Unified, Ravenswood City Elementary, and San Juan Unified in Northern California.

The findings of the participating districts were reported in a publication funded under the Cooperative Research Program of the Office of Education, U.S. Department of Health, Education, and Welfare and entitled *Special class: Programs for intellectually gifted pupils* (Robeck, 1968). As an outgrowth of this, a number of volumes were published by the state, and these documents have been made available to the districts conducting programs for these children. Each volume deals with an academic area such as social science or science, and sets forth suggested activities and guidelines suitable for use in educating gifted children.

During the years of the study problems developed, and although nearly 90,000 gifted students were identified and placed in programs throughout the state, district administrators became discouraged as costs rose and funding failed to keep pace. As a consequence, a number of districts cut back their own contributions to the programs, and concern grew regarding the future of the program in California. Then on December 30, 1966, the Assembly Committee on Education recommended

1. that the Legislature more clearly establish the objectives for the existing mentally gifted minor programs,
2. that the state increase its support to a maximum of \$200 per pupil per year for program expenses and to \$40 per pupil for the initial identification costs,
3. that the state establish a system of scholarships for teachers of academically talented students,
4. that certain restrictive provisions of the Education Code be suspended when such action might improve the program for gifted children, and
5. that there be a "Statewide Council on Talent Development."

Legislative Modification: As a result of this report, Assembly Bill 272 was passed in 1967, and it increased for one year only the program support to \$60 and the identification support to \$40 per child. The old funding formula was retained, however, and the participants were limited to 2% of the average daily attendance (ADA) in the state's schools. As a consequence, the funding was insufficient, and it was necessary for the state to prorate funds at 55% that year. Those involved in the program were at a loss since the proration meant that the monies anticipated were not forthcoming. As a result, many districts had to cover program deficits from their own funds. During this same year, however, another special education program in the state was given \$14 million to offset its \$17 million deficit, but no monies were made available to the MGM program to offset its \$2 million deficit. Several bills were introduced that would have provided the extended support, but all were killed as a result of the early adjournment of the state legislature.

Concern continued to grow, and in June of 1967, a special study was underwritten by the Legislature. The results of the study were not surprising, for it was again shown that there was a need for increased monetary support if the program were to accomplish its aims. Those conducting the study recommended that \$150 per participating pupil be provided and that \$50 per pupil be made available for identification. Unfortunately, despite the report of the legislative committee, the Legislature did not make the funds available. Instead, the termination date of AB 272 arrived, and instead of increased funding being made available as suggested, the funding reverted to the previous

figure of \$40 per year for each participating mentally gifted minor. Perhaps other action might have occurred, but again the Legislature adjourned early. It was again necessary to prorate the available funds, and this time each district received 84% of the monies promised.

Those involved in the program began to seriously doubt the state's commitment to meeting the needs of the gifted, but in 1968 Senator George Miller stated at a hearing on the MGM program that the Legislature had been known to augment programs when sound guidelines were established and materials and leadership were available. Hopes rose when in 1968 it appeared that federal funding might make it possible to establish 20 3-year pilot programs designed to develop techniques of identifying and teaching underachieving, culturally disadvantaged mentally gifted minors. As a consequence of the expected federal funds, Assembly Bill 364 was passed, but because the implementation was contingent upon federal monies that were not forthcoming, the bill was never implemented.

The interest in the gifted underachiever and culturally disadvantaged gifted did not abate, however, and later that year Assembly Bill 807 passed. The bill directed the State Department of Education in California to develop criteria for identifying underachieving, culturally disadvantaged children as mentally gifted, to develop standards for special programs that would meet the needs of this group, and to conduct a survey to determine the number of such children in the special programs for the gifted.

During this same period a correlative interest was developing, and special state and federal funds were made available to promote college-level classes for gifted and high achieving students in the state's high schools. Statewide training institutes were held, and districts were encouraged to send teachers and administrators to Advanced Placement Conferences and training sessions conducted by the College Entrance Examination Board, experienced Advanced Placement teachers, and college personnel. NDEA Fellowships were granted to some of the state's teachers, and under the direction of Dr. Earl Sams the fellows were given training in the area of program development.

ADVANCED PLACEMENT INTEREST GROWS

As a result of this thrust, the Advanced Placement Program developed into one of the state's major offerings for the highly talented academic student. Although some districts limited participation to those identified as gifted, many opened enrollment to any student who would truly benefit, and little by little the universities and colleges throughout the state began to grant credit to those high school graduates who had taken and scored "3," "4," or "5" on this national examination.

As universities and four-year colleges began to support the program, the state's Community Colleges also began to grant credit. Now students in this program have an excellent opportunity to enter college with advanced standing. Some students even acquire sophomore standing from the two hundred colleges and universities that grant sophomore standing for three or more successfully completed examinations.

At last, during the school year 1968-1969, federal monies did become available through Title V, ESEA. The money was used to prepare a statewide framework in gifted-child education, to develop curriculum evaluation guidelines, and to produce 36 exemplary curriculum guides in eight subject areas across four grade-level ranges. Unfortunately, many districts were providing the gifted with "enrichment in the regular classroom," and it was through these new guides that an attempt was made to encourage participating districts (some 254) to go beyond the "additional work" or "supplemental book" approach so often used in the education of the state's 115,000 identified gifted.

LEGISLATIVE INTEREST CONTINUES

During this same year, increased legislative interest and support resulted in the introduction of a number of bills designed to aid the gifted program. Assemblyman Dent introduced AB 409, and Senators Teale and Rodda introduced Senate Bills 121 and 306. All of these bills were designed to increase the level of support to \$150 per pupil for the year for operational costs and to \$50 per child for identification costs. In addition, Assemblymen Bagley, Veysey, and Cory introduced legislation designed to increase the support at other levels. Despite their interest, these legislators were unable to muster sufficient support to pass any legislation that would insure funding at a level

more than that proposed some eight years earlier.

In 1969, the Legislature also heard the report on the study made regarding the identification of underachieving, culturally disadvantaged children as mentally gifted. However, although procedures were suggested, their reliability and validity were not established. Funding continued to be based upon 2% of the average daily attendance of the state's enrollment in grades K-12, and \$60 was provided for each identified mentally gifted minor. During this same period the number of identified gifted was rising, and the population was approaching 3% of the ADA. It was found that more than 2% of California's school children scored 132 or higher on the state-approved I.Q. tests (Stanford-Binet, WISC, and/or Lorge-Thorndike). It was noted that by adding underachieving, culturally disadvantaged children (who might or might not prove to be gifted) the total population might increase to 4% of the ADA, which would result in a funding proration of 50% unless surplus monies were made available to cover the probable deficit.

This possibility was noted by the Legislature, and in August of 1969 AB 606 was passed. It provided school districts with \$40 for every child identified as gifted and an additional \$60 for the categorical program's expenses. In addition, the funding formula was raised from 2% of the ADA to 3% of the ADA. It was the intention of the Legislature to provide space for the students who would be admitted as culturally disadvantaged. This change in formula bought time for the program, but the numbers continued to rise. By 1974 the 4% figure was not far distant.

In 1972, Senate Bill 364 was drafted, passed, and signed into law by the Governor. This bill provided for an increase in funds over a 3-year period. In 1972-1973 the funding was to be \$70 per child; in 1973-1974 it would increase to \$80 per child; in 1974-1975 it would again increase to \$90; and finally in 1975-1976 it would reach \$100 per child. The bill also increased the identification reimbursement to \$50 per child. On paper this bill looked splendid to those involved in the program; in actuality, however, as the number of participants crossed 3% and moved toward 4% it was again necessary to prorate funds, and discouragement hit a new low. Those involved in the program — parents, teachers, administrators, and students — began to despair that a solution would never be worked out.

ORGANIZATIONS PRESS CONCERNS

This concern resulted in the formation of a new group, Professional Advocates for Gifted Education (P.A.G.E.). This was established by administrators from districts with 1000 or more gifted students in programs, and the purpose of the group was twofold — to promote favorable legislation that would alleviate the financial pressures and provide foundations for sound programs and to give administrators of large districts an opportunity to share materials and ideas. This group and the California Association for the Gifted (C.A.G.) joined with the state's parent groups to try to solve the myriad of problems facing gifted education in California. With the help of interested and dedicated legislators, a bill was drafted by Assemblyman McCarthy. It passed through both houses but was vetoed by the Governor. Thus, funds were not made available to meet the costs that would accrue were the committed \$90 per child to be honored. Instead, districts again found themselves meeting the deficits incurred as a result of planning for \$90 and building budgets accordingly.

CONTROLS TIGHTEN

Because the Governor and some of the legislators were concerned about the accountability of the gifted programs throughout the state, audits were begun in 1974. For the first time since monies were first made available for gifted education, auditors were sent out to the districts in order to determine whether or not the state-approved programs were living up to their commitments. It has now been established that audits will be an integral part of the programs in the future, and administrators from groups such as P.A.G.E. and C.A.G. are working with the state department to draft valid evaluation procedures and guidelines for participating districts. Although each participating district must make yearly reports, 1974 was the first year that on-site inspections were used.

It has been said that change and advancement occur only when tension exists; if so, then perhaps that fact accounts for the great strides that have been made in educating the gifted and in formulating programs for them. During this entire monetary crisis, districts have been working innovatively to develop programs that can be successful on limited budgets. They have banded together in loosely structured groups to meet and share ideas; they

have pooled resources and held conferences; and organizations such as C.A.G. have sponsored conferences and are now helping to defray the expenses of mini-conferences (regional sessions and seminars) so that more and more of the teachers, parents, and administrators can get together to share ideas and learn how to best meet the needs of the gifted children with whom they are involved.

Those working in this program find that they concur with the Assembly Education Committee's 1966 report which stated, "We conclude that programs for the mentally gifted minors constitute a vital part of the educational system of California and should be redesigned and reorganized to stipulate the development of the maximum potential of both students and programs. Talent development is an important part of any growing and productive state. Without the intellectual and creative skills to meet the unknown problems of tomorrow, any society will begin a process of stagnation and decay."

LIMITATIONS SPARK CREATIVITY

Not all of the effects of this proration yo-yo were negative, for the financial problems forced districts, administrators, and teachers to look for inexpensive, innovative alternatives to expensive program offerings. As these alternatives were developed and tried, the successful ones became the basis for sharing sessions among the state's gifted organizations. As a result, some of the most educationally exciting programs now in existence are ones that require only limited funding.

Through interschool cooperation, many districts have been able to offer advanced students training commensurate with their ability levels. For example, many high schools have computers on site, so in districts such as Pasadena, interested students from the seventh and eighth grade MGM program are bussed to a nearby high school for a special class once a week. The instructor who teaches computer programming to the high school students is released one hour per day so that he can give this two-semester offering in computer language and programming to the junior high school students. In addition, interested sixth- grade gifted students are given five-week modules of training one day per week for an hour. Obviously, five weeks is grossly inadequate for a thorough introduction, but the intent is to whet the students' interest so that they will continue to be involved during junior high and senior high school. Because the district provides the necessary buses, the only cost to the program is for one hour per day of the teacher's time at a total cost of approximately \$3,000 for the year. It might even be possible to avoid that cost if the schools involved were in need of increased computer class enrollment and wanted to gamble on these introductory offerings piquing the interest of the young so that they would enroll upon reaching high school.

Such was the case for the advanced music training program provided to all interested seventh- and eighth- grade gifted and high achievers in 1974-1975 at Pasadena High School. The teacher of choral music was concerned by the decreased enrollment in choral music at the senior high school level, so she worked closely with the music and gifted consultants for the district to work out a program that incurred no cost other than transportation (a cost absorbed by the district). She donated one hour per week during which time interested music students from the city's junior high schools were bussed to the high school site and given a class in choral music. The students who participated in the program were enthusiastic and eagerly took part in the productions she arranged. As a result of this offering, a number of the involved students later made time for choral music in their regular programs.

Costume parties are always fun, plays delight the participant and the beholder, and when the two are combined, the result is an educational offering that makes history exciting. A program entitled "Living History" is offered by John Muir High School in Pasadena through its Intellectual and Social History course. The class, which is open only to students who receive an "A" in their eleventh grade Advanced Placement United States History class, has been one of the highlights of the city's gifted program. The high school students do historical research, select segments of history that lend themselves to dramatization, write detailed and accurate scripts, design sets, borrow costumes (most of them from the instructor, who has an extensive collection), and mount a historical production that presents in 45 minutes thoroughly documented segments of world history. In 1974-1975 the class devised 18 such productions, and the vignettes ranged from the Civil War to The History of Entertainment. The program, which has been in existence for several years, gives the high school students an opportunity to do in-depth research while they are learning the techniques of creative writing. These two skills are laced with so much fun and delightful make-believe that the class, which is limited to 35 students, always has a waiting list.

The flyer that is used to announce the coming events gives an excellent idea of the scope and approach of the course.

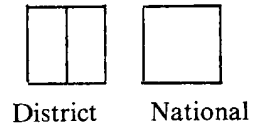
“This class...will give those attending an insight into the customs, mores, and events of some of history’s most exciting periods. Art objects, costumes, weapons of war, and household tools will be among the collector’s items used to illustrate the lectures and shows.”

During the course of the year, the class presented the following shows: FROM SKINS TO TOGAS (Ancient History); MARCHING WITH MARCO (Middle Ages); DREAMS AND REALITIES (Renaissance); HISTORY “AS YOU LIKE IT” (Elizabethan); A NATION IN EMBRYO (17th Century); FROM COLONIES TO NATION (18th Century); FROM ANTI-BRITAIN TO ANTE-BELLUM (1800-1860).

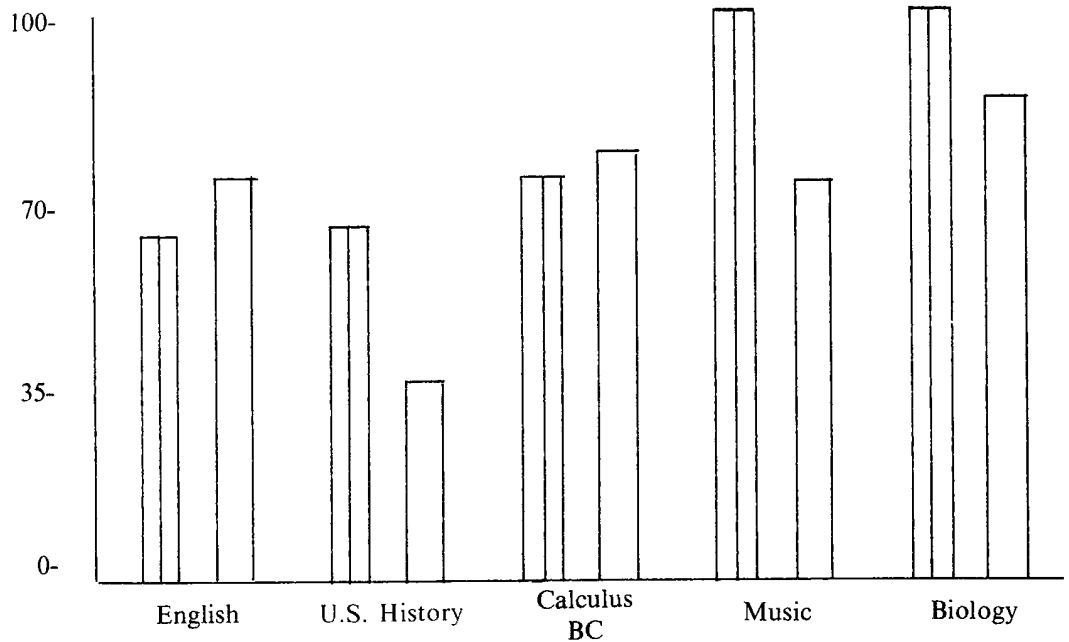
These productions, for which the high school has set aside a large room wherein the students have built a stage, set up lights and curtains, and built flats, are viewed by 4-8 grade gifted students from throughout the district.

These Intellectual and Social History students, like many of their peers, took advantage of the district’s Advanced Placement Program. In addition to United States History, students in the district can take college-level classes in biology, chemistry, European history, calculus, French, Spanish, music, English, and studio art. Because the College Board’s Advanced Placement Program examinations do not include psychology, the district established a College Level Examination Program (C.L.E.P.) class in psychology. Many students choose to take the A.P.P. or C.L.E.P. national examinations, and during the time the courses have been available (since 1967), the pass ratio has remained high.

FIGURE 1
ADVANCED PLACEMENT RESULTS
1975



Scores 3, 4, or 5
Percentage



As Fig. 1 indicates, the majority of the students taking these national examinations do as well as or better than their national peers. In 1975 the achievement level in English dropped for the first time in many years, but the results in U.S. History again exceeded the national level as did the achievement in music and biology. The students in calculus took the difficult Calculus BC examination and scored at about the same level as did others nationwide.

Many of the Advanced Placement students have left high school with college sophomore standing, and one student even graduated from high school with enough units to qualify him as a junior when he entered U.C.L.A. He had used a three-pronged method to reach his goal, for he had taken his regular high school requirements, the suitable Advanced Placement classes offered at his high school, and some college courses at the nearby community college. The local community colleges have been very cooperative about permitting high school students who have completed their tenth grade year to join the regular college sessions. Because the Education Code in the state permits funds to be collected by the high schools if the students are in classes on site for at least one-half of the school day and also permits the community college to collect ADA monies for 11th and 12th grade students enrolled in college classes, it has been possible for many students to attend both levels simultaneously. In some instances, arrangements have been made for students to take classes at nearby universities. Because their achievement levels have been excellent, the colleges are delighted to receive them.

Early graduation has long been a possible "out" for the gifted whom the schools did not challenge sufficiently or for whom there were no more suitable courses. In addition, the Legislature has passed a law making it possible for students to take a proficiency examination (administered 4 times per year by Educational Testing Service). Those who receive a passing score may, if they have their parent's permission, leave high school with a certificate that permits them to enter any community college or apply for civil service jobs. Private and public universities and four-year colleges are setting their own rules about admitting these students, but many have indicated that they will accept those who pass and also qualify by GPA and course background.

Many school districts are working out programs in the area of Career Education, and some are involved in what is known as the Executive Intern Program. Others are patterning their offerings after a program established some years back in Pasadena, California. Pasadena's program began as a summer offering called Job Exploration. The students involved meet every morning with experts in various fields to learn more about those fields and the advantages and disadvantages of entering them. Following the morning sessions, the students go to their "job" assignments to work as interns in the field. Credit is granted to the participants, and many are so successful that they are hired at the end of the summer. This program is given enthusiastic support by the business and educational communities, and it now includes a program for the gifted within the confines of the school year.

Students who have completed all or most of the requirements for graduation may apply to participate in the Career Intern Program. They are carefully screened, their interests determined, and their skills considered. Placement is made on a totally individual basis in the field in which they think they will major. Students have been assigned to do biomedical research in laboratories at the University of California at Los Angeles, to work on genetic readjustment research at the City of Hope, to serve as junior clerks for judges in the courtroom, to teach at local elementary schools under the direction of master teachers, and to work with major engineering firms. In several instances, their work and interest have so impressed the Career Mentors that they have been offered part-time jobs during college. The business and professional communities have been extremely cooperative, and the resultant educational gains have been outstanding.

The students in this program are under the direction of a career counselor who meets with them individually and on the job. He also works closely with their Career Mentor on the assignments given. At the end of each semester the participating seniors are asked to evaluate their experiences and make suggestions for the improvement of the program. To date, the only negative comment has been a reaction against only one assignment per semester. Two students noted that opportunities should be given to change mid-semester to another field in which they have an equal interest. Arrangements have been made to make such changes possible, and the interest in the program continues to grow on the part of students, parents, and the business community.

In addition to the Career Mentors, mentors are provided in other areas. Students who show strengths in particular fields are matched with community experts in them. The students meet with these mentors on their own time, and details of the assignments are worked out on a mutually agreeable basis. In some instances, the students can make special arrangements with their schools to have time during the school day to work with their mentors.

For example, one junior high school student was given the opportunity to spend two days per week with a photographer (photography was the student's major field of interest) on the condition that he would maintain his grade average. He worked as an intern for one full semester, and he is now involved in advanced study in the field at one of the high schools. Experiences such as these allow students with particular interests to explore the field and to gain experiences that otherwise would be unavailable to individuals in their age group.

Some students profit from being allowed time to work independently in given areas; therefore, independent study programs have developed in many California districts. Some districts, such as Hacienda-La Puente Unified, have provided independent study centers and bussed students to those centers for a given amount of time per week. Other districts, such as Torrance Unified, have set up centers in given schools; all of the students who wish to pursue independent study projects in the field of science may sign up for the center and work under the direction of a teacher in the specified area of interest.

In still other school districts, students are assigned to an independent study director who is responsible for their program and contract. The director works out the details of the contract with the student and provides a subject-matter expert from the staff or community who works closely with the student on the project and later with the director to determine the evaluation procedures and credit allocation. Through the channels outlined above students are given an opportunity to explore their fields of interest and possibly even contribute to them. One young science student worked out demonstration models of molecules that are now in use at California State University at Dominguez Hills; two others wrote a book that aroused the interest of a major publishing house; and three others worked out a resource guide for teachers to use in planning programs and field trips. By "taking the lid off," the schools have given this gifted population an opportunity to use their talents in constructive and often very original ways.

The talents of this segment of the school population are often untapped; therefore, many schools in the state followed the lead of Pasadena High School and established a mini-course program. Students with unusual talents are encouraged to share those talents with others. These student "teachers" design courses, submit the outlines to the Board of Education for its approval, and then offer the course for whatever period of time has been designated. The "teachers" receive two units of credit, and "students" at the high school level may receive one unit. The courses offered cover a broad spectrum of interests from modern music to in-depth studies of a particular poet or author. In some instances, the students prefer not to "teach" others of their own age, so arrangements have been made to allow the "teachers" to work with students at nearby elementary and junior high schools. In the latter instances, only the "teachers" receive unit credit. These mini-course offerings provide a rich resource that requires little, if any, monetary expenditures and interferes little, if any, with the overall program since the courses are offered outside of school hours.

Gifted students generally have one frustrating trait in common; they absorb information at unbelievable rates. Because of the desire to have programs offered outside of school hours, the administrators in various schools have set up programs in conjunction with parent groups or colleges. Pasadena established a program called VISTAS and runs it with district funds. Although the budget is very limited, this after-school and Saturday program designed for gifted and high achievers in grades 1-12 provides sessions taught by subject-matter specialists drawn from the district's instructional staff and from community members who are experts in their fields. Each offering is designed to be above grade level and must be something that the students would be unable to get on their own. For example, a young archaeologist offered an after-school class entitled "The Buried Past." This class duplicated in many respects the offering at a local university, and the students concluded the series of academic lectures and presentations by taking part in a university dig. Programs such as these need not be overly expensive if carefully planned. Transportation costs are a major outlay, and programs should be planned so that the bulk of the funds can go into staff and materials, for excellent programs can be run with a minimum of transportation.

Districts have been forced to use their imaginations, and fascinating programs have been developed and community resources tapped. As successes are recorded, ideas are shared, and gradually throughout the state are moving toward a relatively homogeneous program for the gifted. Each district must use the resources available to it, but the shared ideas can often be molded to fit the community, educational, professional, and business resources. Thus, although there is a marked similarity appearing in programs throughout the state, they can never be totally identical since they must meet the needs of the students of a given community and be planned around the resources

of that community.

It is true that no programs can run without funds, but cost should not be used as a major roadblock to the development of programs for the approximately two million gifted and talented children that Dr. Harold Lyons estimates are in the nation's schools, for they are truly one of America's richest resources. We as a nation cannot afford to have them "drop out or get into trouble," so we need to train them within the boundaries of their needs, or their contributions to society will be lost.

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PROVIDING INDIVIDUAL ENRICHMENT WITH AN INDEPENDENT PROJECT FORMAT

Larry Finch and Cecilia H. Solano

Brevard County, Florida, has designed a special enrichment program for talented junior high school students. Specialists in the gifted there feel that independent research projects best serve the interests of such students. Since specific talents are to be stimulated, general ability scores are not used for entrance into the program. Rather, a student has to score within the top 10% of his class on the Comprehensive Test of Basic Skills in the area in which his project proposal is being submitted. Coordinators are assigned by the school system to act as liaison among the teachers, county administrators, parents, and children. In proposals students are limited to asking for \$150 and using local facilities. The best proposals are selected by a committee of community leaders. Criteria used for selection are the content of the proposal, its social relevance, its potential for success, and the impact it is likely to have on the student. Once funded, projects are usually completed in five months, at which time a report is due. Projects done in the past include working with computers at the Kennedy Space Center, building a methane digester, and studying the effects of television advertising on children.

Brevard County, Florida, is known for its role in innovative education. As the community surrounding the Kennedy Space Center, it has gained both support and impetus from its residents for special programs and exploratory efforts in education. Probably the best known of these efforts is Dr. B. Frank Brown's non-graded school concept, first employed at Melbourne High School and since implemented county-wide. In 1972 the Brevard School Board again found itself in a position to begin a unique school program.

The School Board recognized that numerous specific efforts were already being made to provide special *in-school* opportunities for all children. Brevard's exceptional education programs were known both for their effectiveness and for their availability to students. Reading programs, language arts programs, county developed math programs, federally funded environmental programs, and science research programs were available or being developed. In addition, there were the "high-phase" classes that emphasized the teaching of a large amount of difficult material quickly and provided opportunities for individual study and research. High school students were

also able to obtain work experience, and field trips were readily arranged to provide special learning experiences outside of the school.

Although intermediate and junior high students were able to benefit from many of these programs, it was felt that students at this age are at a particularly important developmental stage, characterized by awakening interests and abilities. They are intrigued by the possibilities of a world in which they are just becoming aware. They are at a point educationally where skill development provides a basis for understanding and investigating themselves and the world. Their needs are best served by a program tailored to provide flexibility and geared towards individual interests.

With these students in mind, the School Board funded a program and requested its administrative staff to design an appropriate set of procedures. The following is a quotation from the proposal produced by the staff: "It is proposed that a unique program be initiated in Brevard County to offer learning challenge and opportunity to high academic ability students without defining specific areas, locations, or personnel that will be utilized. Thus each program that is instituted will be unique, planned by the learner in cooperation with his teacher and parents, and will make use of whatever personnel and material is necessary to accomplish the learning objectives. It is anticipated that certain programs would embody experiences that could be used for credit toward graduation under guidelines now being considered by the state accreditation department."

A specific program was developed for providing students the special opportunities indicated by this proposal. Entitled the "Brevard County Exceptionally Talented Study Program," the strategy outlines procedures for several different areas.

ELIGIBILITY OF STUDENTS

Since this program was not designed to be a gifted student program (an extensive "gifted" program already existed in the school system), the eligible students have to have neither a high IQ nor a high overall test score. The admission requirement is that a student be within the top 10% of his group for the previous year on the Comprehensive Test of Basic Skills in the academic area in which the project is being submitted. Obviously, this does not preclude the possibility of a student's submitting a project who scored at the 90th percentile or higher in only one area and who scored average or lower in all other areas. One of the goals of the program, however, is to emphasize individual interests and to allow individual explorations and experiences. Therefore, submission of a project by a student with only one or two specific talents is entirely within the goals of the program. In fact, for a candidate who does not have a broad range of exceptional abilities, this may be one of few opportunities to benefit from his specific area of talent.

In addition to the test score requirement, a student must have maintained a 3.0 or higher grade point average during the previous two years. The rationale is that a student's past performance is probably indicative of his future performance. For a project to be considered completed, a certain amount of work will be required. The 3.0 GPA can be used as an indicator of performance potential. If time and money are to be invested in a student, it is reasonable to want students who will finish the job and will not waste the opportunity.

A third requirement is that a student must be recommended by a teacher and his principal for participation in the program. Teachers are encouraged not to exclude students who have behavioral problems. These activities provide a chance for such students to express themselves and explore their interests and thus help them to adjust better to their classroom situations.

A fourth requirement is that candidates must be in either the fifth, sixth, seventh, or eighth grade. This grade range was selected for several reasons. As was mentioned, the students in high school are already afforded ample opportunities to develop their abilities in many ways, such as by participating in the National Science Foundation (NSF) programs, taking Advanced Placement Program (APP) examinations, independent study, high-phase classes, and a variety of extracurricular activities clubs. On the other hand, students for a program such as this one must be mature enough to work on their own. Many projects involve field trips, and the students must be able to carry out tasks independently. These factors and the opinions expressed in the rationale for the program determined the restriction of student eligibility to the fifth through eighth school grades.

By using a computer system each year, a printout by school of the students who score at or above the 90th percentile on any area of the Comprehensive Test of Basic Skills is obtained. Each school is then sent a copy of the

relevant printout. This printout reminds teachers about qualified students in their classes who might not have been considered for submitting a project. Qualified students are also notified of their possible candidacy, pending successful fulfillment of the other qualifications.

IN-SCHOOL COORDINATORS

One coordinator is selected for each school. He is responsible for all communications concerning the Talented Student Program. He must ensure that information is properly disseminated among the students, parents, county officers, and school principals. He sets up various meetings in which he passes on new information, emphasizes the standard procedures, answers questions, and rekindles excitement and motivation among the people involved. He is also responsible for keeping track of deadlines for submitting projects, statements of expenses, end-of-the-year report forms, project progress data, and other items connected with the program.

In addition, coordinators arrange meetings with the students who are interested in submitting proposals and their parents. These meetings serve to introduce both the parents and students to the program. Here he explains that students may submit a project in any area in which they obtained a qualifying score; e.g., a qualifying score in science would let a student propose a project in any science area. He explains that the proposals are limited financially to an expenditure of \$150, and geographically to the southeastern United States (unless the participant arranges his own payment for transportation outside that geographical area). The only other factors that limit projects are a student's interest and imagination. Many of the parents and students are already familiar with projects from previous years. These past projects and examples given at the meeting enable participants to visualize the score of the program.

Student projects have varied greatly in the past. In a number of them, candidates have proposed attending classes at a local college or university. Although these children were only in the fifth through eighth grades, they have rarely made less than a B in their college level classes. The course content varied from advanced music and art to archaeology. Other projects typically require working with an expert or utilizing a facility that is not available in the school. With these examples as models, students begin to design their own proposals. The meetings of the parents, students, and coordinators are usually held in late fall. Student proposals are due a month later.

REVIEW COMMITTEE

Each coordinator's responsibility also includes setting up a committee at his school to review proposals for feasibility and adherence to guidelines before they are submitted for further consideration. The members of the committee may also help with the search for information sources. While reviewing proposals they may make specific recommendations for change if it is necessary to help a project meet guidelines. Preferably, a teacher, an administrator, and at least one parent will be included on the committee. This group can be of further assistance in guiding the selected projects.

SELECTION COMMITTEE

At the same time that the students are preparing their proposals with the help of the review committee and in-school coordinators, a selection committee is being formed. It consists of approximately twenty-five community leaders. The committee is divided into several sub-committees depending on the type and number of proposals submitted, e.g., Physical and Engineering Sciences, Social Studies, Biological and Environmental Sciences, Cultural and Fine Arts, and Public Service and Careers. Each sub-committee member is mailed a copy of the projects received in his area before the committee meets for the first time, thus providing an opportunity to preview the proposals. At the first meeting committee members begin the selection process. Selections are based on several criteria that have been developed over the years. There are four major ones: content of the proposal, impact on the student, relevance to society, and success potential.

Content itself has four inner criteria. The first of these is individuality. Raters take into consideration the uniqueness of the proposal. Is this something the students have come up with themselves? Is it a copy or extension of a previous proposal? Does it reflect the individual's input enough, or has it been influenced too greatly by an adult? Second, the objectives of the proposal are also important. Toward what goals will the student be working?

The third criterion is the concreteness of the project plan. How will goals be accomplished? Have the details been worked through so that a clear picture of what will be accomplished is presented? Has the student contacted the resource persons with whom he wants to work? Output is the fourth aspect of content that is emphasized. What will the project produce? Will the result be valuable for just the student or also for others?

Impact on the student is another major criterion. How will the student be affected by doing this project? Will the impact on the individual be lasting? Will the project be worthwhile?

Relevance is in terms of the larger society, as well as Brevard County. Is the proposal related to the needs of society? Will the research cast light on a problem, the solution of which will aid Brevard County or some other area?

Success potential, the final criterion, is whether or not the proposal has a realistic chance of being completed successfully. Can the idea be followed through — i.e., is it feasible? Some effort must be employed to determine the practicality of the proposal, even though imagination, individuality, and creativity are encouraged. It is pointless to fund a project that has no chance of completion.

The selection process is structured around these guidelines. Each subcommittee member rates the projects in his area on a rank order basis. The rank orderings of all members of the subcommittee are averaged to get a mean rank ordering for each project. These rank orders are then used to determine which projects will be funded. Selected projects are established by matching available money to the rank order lists. The committee members go down the lists as far as they can with money provided by the School Board. All money goes to projects, as administrative costs are tied to other budgets. Since anticipated costs have been detailed in the proposals, the exact amount of money can be encumbered for each child. Students whose projects have been selected are notified immediately. All candidates are sent a certificate of merit for having submitted a project proposal.

PROJECT COMPLETION

Having succeeded in getting his proposal funded, the student now finds that the actual work of doing the project is at hand. Completing of projects usually takes four to five months. In-school coordinators hold regular meetings to check on student progress, clarify questions and assist in problem solving. Parents also usually take an active role. However, we do encourage parents to leave the project as much as possible to the students. Obviously, some practical assistance is necessary, even if only to provide transportation.

Coordinators also serve to remind students not to let their time slip by. The students' progress must be monitored closely without their feeling harassed. Coordinators arrange intra- or inter-school presentations of research results. A special project is usually very interesting to other students. Students with projects can make valuable contributions to other students' educational process by sharing information from their work.

Relatively few problems arise that cannot be handled at the school level. When such problems do arise, however, coordinators may call the administrative office for assistance. Frequently the problem concerns obtaining permission to visit a facility. The school coordinator may feel someone from the county office may have more success; often that is true. Many of the other questions are about financial matters. Because of legal restrictions on expenditures of public funds, payment for projects can become complicated. The program underwrites all the costs of a selected project, including transportation, room, board, and materials, for the student and his chaperone. The school system will reimburse only three-fourths of the commercial carrier expense of a parent, however, as opposed to the one hundred percent reimbursement of a teacher. This policy is to encourage the participation of teachers and thereby get a double benefit for the school system.

In the middle of May a luncheon is organized for the Selection Committee and certain students. This meeting enables the committee members to see the results of their selection efforts. Five of the most successful projects are chosen. These students give a brief report to the group on their accomplishments and experiences. Parents, students, and the Selection Committee all seem to enjoy this activity very much.

Finally, reports from all students are due by the end of the school year. The student is encouraged to use a brief one-page form developed for this purpose. He indicates what he has learned, what problems he has encountered, what suggestions he has for future students, and what his future plans are concerning his topic.

Examples of a few projects may serve to conclude this description of the Brevard County program. One project in particular has received a great deal of publicity. A fifth grade student was concerned about the effect of child-directed advertising. She devised a questionnaire to test students' reactions to advertising and how they were

influenced to persuade their parents to buy certain products. She eventually was asked to come to Washington to testify before a Senate Committee investigating child-directed advertising. Since then new governmental regulations have come out which many people in the field feel are a result of her testimony.

In the past year there were a large number of projects just in mathematics and science. One student was interested in mathematical capabilities of computers. He worked several times with companies involved with the Kennedy Space Center. A fifth grader studied the astronaut training facilities at the Space Center. Using the Space Center again another fifth grader investigated the Skylab-Shuttle program. With Sea World so close, a student interested in marine biology learned about the anatomy, physiology, behavior, intelligence, communication and efforts at protection of the bottle-nosed dolphin. Another project was on aquaculture, which involved a trip to Auburn University and observation there. A seventh grader built a methane digester to study the feasibility of production of methane for home consumption.

From this partial listing of projects it is obvious that students have learned a great deal in many areas, and that they have had numerous opportunities to develop their own ideas and interests. In addition, this program has been a way of involving the local community in the educational process. Not only are many of the community resources utilized for projects, but also the selection and review committees are always made up of local people. The program's publicity informs the rest of the community of some of the things happening in the school system. Community involvement engenders community support, and with it the program has been considered an ongoing success.

THE GOVERNOR'S SCHOOL OF NORTH CAROLINA: A SUMMER PROGRAM FOR GIFTED AND/OR TALENTED HIGH SCHOOL STUDENTS

James L. Bray

ABSTRACT

The Governor's School of North Carolina is a six-week residential program on the campus of Salem College in Winston-Salem, North Carolina, for 400 intellectually gifted North Carolina high school students.

The School has been operated by a Board of Governors under the jurisdiction of the State Board of Education for 13 years. During the summer session it provides a variety of unique and distinctive educational experiences for the selected students, and, in the process, serves as a model in action, helping teachers and administrators throughout the state provide appropriate preparation for superior students within the local school systems.

The curriculum emphasizes theory, especially 20th Century theory, and imaginative or inventive extrapolation into far-ranging fields. The attempt is made to give the students, the future cultural leaders of the state and nation, an inspirational and curiosity-whetting peek into the latest accomplishments, problems, and theories in the various fields of the arts and sciences.

In addition, students are led by suggested reading, lecture, and discussion in small groups into probing two academically unchartered and exciting areas: general conceptual development, emphasizing training in the interpretation of facts, and personal and social development. Guest lecturers, concerts, dramatic productions, exhibits, forums, and a program of films further expose the students to contemporary culture. Work at the Governor's School is supplementary to, rather than advanced work in, the general high school curriculum. No credit or grades are given. No charge is made to students in residence. The Governor's School program attempts to introduce and stimulate critical inquiry and thought for student application in continuing education.

Mr. Chairman, honored guests, ladies and gentlemen: Please allow me to extend gratitude on behalf of the State of North Carolina for including the Governor's School of North Carolina in this symposium. We are delighted to have the opportunity of noting to you a program that has completed thirteen years as a summer program for the gifted and talented high school students of our state.

For the purposes of this symposium I shall concern myself only with the program dealing with the intellectually gifted in the school. Dr. Stanley noted the limitations of the symposium in his first communication with me, and I am glad to comply. Even so, I think it necessary to mention that all of our students — approximately 400 each summer — must meet the criteria for giftedness, and this also includes any member of the student body accepted in the performing arts.

The Governor's School of North Carolina began in 1963 as a project initiated through the Office of the Governor. Governor Terry Sanford was very instrumental in requesting an initial grant through the Carnegie Foundation for the funding of the school for its first three years. Since that time the school has been funded by the state legislature and is operated through the State Department of Public Instruction. Our budget is approximately \$220,000 per annum, of which amount approximately half is spent to rent the facilities of Salem College, Winston-Salem, North Carolina. The college is a private liberal arts college for women in the center of historic Old Salem and is centrally located to all geographical areas of the state.

In its beginning few years, the Governor's School of North Carolina had no designed curriculum, no fixed attitudes on the education of precocious students, and was in the truest sense an experimental summer program for gifted and talented high school students from throughout the state. From its very beginning, however, it was decided that there would be at least one representative from each of the one hundred and forty-nine school units. We continue to follow this practice from the scores of nominations made each year. It was also decided from the beginning to deny no one admission to the school on the basis of race, creed, color, or national origin.

Largely through the efforts of Dr. H. Michael Lewis, now retired, who served the school as its Coordinator of Curriculum, a course of study did evolve. Dr. Lewis would be the first to admit that many of the ideas developed for the curriculum were those arising from the research of both the chairman of this symposium [Professor J. W. Getzels], participants in this symposium, and Dr. Terman, for whom the symposium is celebrated. It is therefore a rare opportunity for me to be able to extend our most gracious gratitude in person today.

Before I acquaint you with our curriculum design and rationale, I think it would be wise to quote Alfred North Whitehead from his *Aims of education*:

“...In the conditions of modern life the rule is absolute, the race which does not value trained intelligence is doomed. Not all your heroism, not all your social charm, not all your wit, not all your victories on land or at sea, can move back the finger of fate. Today we maintain ourselves. Tomorrow science will have moved forward yet one more step, and there will be no appeal from the judgment which will then be pronounced on the uneducated.”

Hence, the Governor's School of North Carolina viewed its academic mission as answering two important questions in the education of gifted high school students: (1) What is the nature of the gifted student? and (2) What differential educational experiences should be extended to such students once they have been identified?

In answering the first question we relied on the expertise of the aforementioned theorists in the study of gifted and precocious youngsters. The answer to the second question was not as easily determined. It was realized quickly that ours was a summer program and limitations would have to be properly defined. Therefore, it was determined that the school would emphasize theory over practice. It was agreed that since theory must always precede practice, there was a special need of the summer program to elevate theoretical knowledge to its proper place as an educational experience for gifted high school students. This point of view was implied in the following quotation from a study by Harvey, Hunt, and Schroder, *Conceptual systems and personality organization* (John Wiley 1961):

“...The greater one's abstractness, (1) the greater is his ability to transcend immediacy and to move more into the temporally and spatially remote, (2) and the more capable he is of abstracting relationships from objects of his experience and of organizing them in terms of their interrelatedness.”

But certainly a school for intellectually gifted students which stated simply that it would stress theory over factual content would have at best a vague educational objective. It was therefore determined that the theories stressed in all of the academic disciplines would be the most up-to-date. This was as true for our performing arts as for our academic areas of study. We are perhaps one of the few schools in the nation concentrating our efforts in educating gifted students to the latest Twentieth Century ideas and concepts. If indeed our students are to be the future leaders

of our state, we are desirous that they lead us into the Twenty-First Century and not lead us back to the Sixteenth or Seventeenth Centuries. And while we encourage multi-media presentations as a part of our methodology, we have stood steadfast in our refusal to employ the fads of educational “gimmicks” to accomplish our instructional goals.

It may be of interest to know that we select our faculty from high schools as well as from colleges and universities. They come to us from both within the State of North Carolina and from without. In short, we attempt to recruit gifted teachers who are willing to take intellectual risks in teaching our gifted students.

Basically, our curriculum is divided into three parts. All the academic disciplines (English, mathematics, foreign language, natural science, physical science, and social science) we have designated as Area I. The students spend two-thirds of their class time each week in this concentrated study. Classes for these disciplines are offered twice each day, and the average class size is approximately 15.

Please keep in mind that our school is residential and that all costs to the students except spending money are paid by the state. Board, room, meals, books, recreation, concerts, materials, films, media hardware, and health facilities are all furnished to each student.

Area II — in which the student spends about one-sixth of his academic week — concerns itself with epistemology or “knowledge about knowledge.” An attempt in this area of study is to introduce students to both structures and systems of knowledge with the hope that such a study will allow a realization of the interrelatedness of all knowledge at some point. Make no mistake; we believe the Governor’s School experience should be an intellectual one. We believe students should be able to seek explanations of new knowledge at levels of abstractness deeper than sensory or perceptual levels. It is for the mastery and the bringing of some understanding of this level of thought to our students that Area II was designed.

Area III — *Personal and Social Development* — is a completion of our curriculum. Gifted youngsters usually experience difficulties — principally of anxiety — in relating to others and to themselves. Most of these difficulties arise from their very giftedness. As our students probe with their teachers into the depths of new theories and abstractions in their Area I studies, some anxiety is expected. Indeed, Area II has been designed to confront our students with the latest generalizations, abstractions, and theories that undercut the more fragmented special disciplines.

As Dr. H. Michael Lewis has described it in his booklet, *Open windows onto the future: Theory of the Governor’s School of North Carolina* (mimeographed by the Governor’s School of North Carolina 1969):

“...In Area III at the Governor’s School, we try to give our creative youngsters some insight into the process of creativity and its anxiety producing mechanisms. As high school youngsters of a crucial age, with little understanding of their own mental and emotional processes and the problems that arise from society’s usual misunderstanding of its genial leaders, these youngsters are ripe for retreating into uncreative conventionality, there to hide their God-given creative light under a bushel.”

Thus, our rationale is that if Areas I and II are to be achieved, then Area III makes that achievement possible. All three areas are dependent on the others, and all three were designed to make our attempt for a summer of intellectual inquiry possible.

We at the Governor’s School of North Carolina do not offer our program as a panacea for all summer programs for the gifted in the land. We do offer it as simply one plan carefully thought through and offered as an educational experience. Our research has indicated that our program has probably been most effective in the effective domain than anything we have attempted to do. That is, student attitudes have been modified from attending our summer program. For the most part the students have become less fixed in their thinking and more open in their consideration of new intellectual knowledge. There have been some problems of adjustment in their reentry to the environment of their hometown schools — more likely to be convergent in their goals of learning than they are divergent. We attempt to prepare students for this problem.

I have attempted in the time allotted to me to give you the briefest insight into the history and practices of the Governor’s School of North Carolina. In no way would I have any of you construe my remarks as offering the school as a model for all to follow. I present it only as one model for the education of gifted youngsters. We at the school are quite desirous to modify our program as more and more is learned about the identification and ways of

instruction for these students. We have always opened our doors during the summer for anyone in the world to analyze, probe, and join in our search. Hence, I offer that invitation to those in attendance at this symposium.

Most of us in this auditorium know that we have only scratched the surface in our knowledge about the nature of gifted students and the nature of what should be attempted in their education. If the Governor's School of North Carolina has made a contribution to those questions, we are most gratified.

Thank you again for inviting us to participate in this honored symposium and for allowing us to give a capsule version of our work in North Carolina.

THE SATURDAY WORKSHOP OF THE GIFTED CHILD SOCIETY OF NEW JERSEY

Albert J. Pra Sisto

ABSTRACT

The Gifted Child Society, Incorporated of New Jersey is a non-profit, tuition-supported, parent organization whose avowed purpose "is to provide educational enrichment for intellectually gifted children and to seek public recognition of their special needs." Organized in 1957 by a handful of concerned and dedicated parents, the Gifted Child Society, through its educational appendage, the Saturday Workshop, presently supplements the educational and social needs of nearly 500 gifted students between the ages of 4 and 12. Twice per year, spring and fall, students participating in the Workshop are offered over 50 courses in the sciences and humanities, each noticeably different from courses offered to them in the public schools and each designed to meet the special learning needs of gifted children. Finally, the Saturday Workshop has attempted to serve not only gifted children but also their parents, through parent discussion groups, and their public school teachers, through demonstration workshops.

ORIGIN AND ORGANIZATION OF THE GIFTED CHILD SOCIETY

The Gifted Child Society, Incorporated of New Jersey is a non-profit, tuition-supported, parent organization whose avowed purpose "...is to provide educational enrichment for intellectually gifted children and to seek public recognition of their special needs" (Gifted Child Society Constitution 1974, p. 1). It was organized in 1957 by a group of parents in Bergen County, New Jersey, who were appalled at what was *not* being done for their gifted children in the public schools and who were determined to provide their children with educational and social programs suited to their special needs and abilities. Starting on a small scale, by 1975 the Gifted Child Society had developed into one of the nation's largest parent-run organizations offering gifted children out-of-school enrichment through its Saturday Workshop program and diligently working for improved educational opportunities for gifted children at the local, state, and national levels.

Since 1964, the Gifted Child Society, Incorporated has been governed by its Constitution, which reflects the organization's broad objectives and goals; this is periodically revised in order to maintain organizational efficiency

or to legitimize new activities or goal changes of the Society. By direction of its Constitution, responsibility for the operation of the Gifted Child Society is vested in a non-paid elected and appointed Executive Committee. It is this Committee which formulates policy, initiates new activities, officially hires Society and Saturday Workshop personnel, oversees committee work, and in general, guides the activities of the Gifted Child Society. The Executive Committee consists of a president, two vice presidents, a treasurer, a recording secretary, and a corresponding secretary, all of whom are elected to their positions by the general membership. Appointed members of the Executive Committee consist of the chairpersons of the various standing committees such as Curriculum, Research, Newsletter, Ways and Means, Legislative, and Scholarship. Additionally, the Executive Director of the Gifted Child Society and the Saturday Workshop School Co-ordinator as well as the Curriculum Co-ordinator are salaried non-voting members of the Executive Committee.

In keeping with its purpose of seeking public recognition of gifted children and their needs, the Society by direction of the Executive Committee has engaged, over the years, in a variety of periodic and on-going activities:

1. An organizational statewide newsletter is published each semester disseminating information about the Society, the Saturday Workshop, and local, state, and national news concerning education of the gifted.
2. An on-going research committee collects, analyzes, and distributes data gathered from parents and past and present students of the Society and the Workshop.
3. Two teacher demonstration workshops are sponsored each semester to familiarize public school educators with the Saturday Workshop and the instructional needs of gifted children.
4. Formal and informal parent discussion groups are conducted to help parents better understand their children and to assist them in their attempts to have programs for gifted children initiated in their school districts.
5. Guest lecturers and consultants are provided free of charge to boards of education, teacher groups, parent-teacher organizations, and state and national legislators interested in the education of gifted children.
6. The largest private research and lending library on gifted education in the state is maintained and constantly upgraded.
7. The Society initiated and co-sponsored a statewide consortium on gifted education, the so-called "1975 Princeton Conference," to develop recommendations for education of the gifted in New Jersey.
8. Development, through a Ford Foundation grant, of a handbook for parents wishing to establish private educational programs for gifted children is near completion.

Yet, of all the activities of the Executive Committee of the Gifted Child Society, none is more important than sponsorship of its educational enrichment program, the Saturday Workshop.

ESTABLISHMENT AND DEVELOPMENT OF THE SATURDAY WORKSHOP

When the Gifted Child Society considered the prospect of operating an enrichment program for gifted children, it faced the problem of what format to adopt: exclusively field trips? after-school classes? Saturday morning classes? a full-time private school? After much research and deliberation, the Society concluded that the form of its program should be dictated by its primary functions (Ginsberg and Harrison 1975, p. 115):

1. "To offer enrichment and an opportunity for very bright children to learn from exceptional teachers and other bright children;"
2. "To do this while permitting children to remain in the mainstream of public education and the diverse society;"
3. "To provide, through its program, a teaching-learning model for gifted children that the public schools are encouraged to copy and include in their 180-day session."

Considering these three objectives, the Society determined that for educational, philosophical, financial, and practical purposes its program should take the form of Saturday morning enrichment classes, thus allowing the children the opportunity to participate in an enrichment program that utilizes the availability of the best possible teachers and does not totally segregate the students or overload their weekday schedules or their parents' finances.

Once the form of the new program had been determined, the question arose as to who should be permitted to attend the Saturday Workshop classes. There was no doubt that the program should be limited to gifted children, but how does one determine who qualifies as "gifted?" The Society surveyed the existing literature and discovered a vast array of definitions of "giftedness," some of them conflicting. Not wishing to become bogged down with a

divisive and possibly devastating argument over which definition to use, and realizing that the Society was not yet competent to challenge expert opinions scientifically, it was decided that a definite official definition of “giftedness” should be avoided and, instead, a broad based, multi-criteria, relatively simple admitting procedure be established. A policy involving three criteria was finally adopted by the Society: a group or individual I.Q. rating of 120, school certification that the child is mature and well-adjusted, and confirmation that the child would likely benefit from a program for above-average children.

Of course, this policy is not without criticism. Over the years it has been challenged by various educators, parents, and other concerned individuals. Some point to the lack of tests for creativity, others question what is meant by “well-adjusted,” some feel that an intelligence rating of 120 is too low for a gifted program, and still others object to the use of intelligence tests at all, being of the opinion that they are discriminatory against minority groups as well as being incapable of really measuring a person’s “intelligence.”

The Society recognizes the possible validity of these criticisms and does not consider its admittance policy inflexible; in fact, it is periodically reviewed. Quite possibly, in the near future tests for creativity such as those developed by Torrance (1965) and individually administered intelligence tests will become part of the entrance policy. Yet, despite its shortcomings, the entrance policy has been practical and realistic for a spring and fall Saturday morning program. It has served the Society’s Workshop well by admitting, over a period of 18 years, nearly 10,000 students to a program which provides them with advanced enriched courses, outstanding instructors, and a stimulating social atmosphere often unavailable to them in the public schools.

THE SATURDAY WORKSHOP CURRICULUM

Upon selecting a format for its enrichment program and establishing an admittance policy, the Society then turned to the problem of developing a curriculum for its Saturday Workshop. In the early years of its existence, Saturday Workshop curriculum development was assigned to a volunteer parent group — the Saturday Workshop Curriculum Committee. As ideas for courses flooded to the Curriculum Committee from parents, students, teachers, Society administrators, and Curriculum Committee members, the Executive Committee recognized how valuable a professional educator would be to curriculum development and therefore created the position of Curriculum Co-ordinator to work with, assist and advise the Curriculum Committee in its vitally important task. To achieve the original concept envisioned by the Society, establishment of Saturday morning enrichment classes for intellectually gifted children, the Curriculum Committee devised some basic guidelines to assist it in developing its course curriculum:

1. To be truly enriching, the scope of any courses offered needed to be recognizably different and go far beyond the depth and breadth of courses offered by the regular school curriculum; “more of the same” had to be avoided.
2. A practical, logical sequence and balance of courses had to be maintained in both the sciences and the humanities, thus permitting students to progress from basic generalized courses to more specific advanced courses e.g., from “All About Science” for five-year-olds to “Biology” for seven-year-olds to “Microbiology” for eight-year-olds. Also, care had to be exercised to insure that courses offered were not only those that were the most popular or financially rewarding, but were also those that were necessary to give gifted children as many opportunities as possible for development in order to prepare them for leadership roles and for life in a diversified society.
3. Most importantly, any courses offered should recognize and reflect the learning characteristics and needs of gifted children as reported by persons specializing in education of the gifted.

Utilizing these guidelines, the Curriculum Committee staff, under the direction of the Curriculum Co-ordinator, has been able to develop hundreds of different courses.

For each of the two ten-week semesters, the Workshop publishes a brochure listing and describing nearly 50 different courses in the sciences and humanities. Parents are encouraged to discuss the various courses with their children and then permit the children to select the courses in which they wish to enroll. By the end of the month-long registration period, nearly 500 students ranging from four-year-old pre-schoolers to junior and senior high school

students will have registered for the semester. It is also worth noting that the Saturday Workshop follows a rather unusual procedure for grouping its students. Normally, a program for gifted children would organize its classes according to the mental age of the students. However, the Workshop and the Society have not lost sight of the fact that we are dealing with the total child, not just his intellectual abilities. The Society firmly believes that a six-year-old child, no matter how gifted, is still physically and often emotionally still a six-year-old child and therefore, needs the enjoyment and experience of social contact with children of not only similar mental abilities but also of similar chronological age. Naturally, this grouping policy makes the job of the instructors more difficult since they must deal with the children on a near one to one basis, yet, because of the low number of students permitted to enroll in each class, teachers are able to give each child the necessary attention and instruction.

A typical Saturday Workshop course curriculum, broken into time units and age groups, would be as follows:

9:00 A.M.

Mini Scientists	5-6 years old
All Kinds of Science	6-7 years old
Model Rocketry	7-8 years old
Let's Go A.P.E. (Study Skills)	8-10 years old
Introduction to Computers	9 and up

10:00 A.M.

The Sound of Music	4-5 years old
Secrets of Nature	4-5 years old
Children's Grab Bag	4-5 years old
Fin, Fowl, and Fur	4-5 years old
Mini Market Place (Economics)	5-6 years old
Art for Young People	5-6 years old
Physics With No Math	5-6 years old
Magic Carpet (Social Studies)	5-6 years old
Six-Legged Science	6-7 years old
Paint Pots, Puppets, and Prints	6-7 years old
Great Stories From Great Music	6-7 years old
The World of Plants	6-7 years old
You and Your 3 Billion Relatives (Social Studies)	6-7 years old
It's Magic!	7-8 years old
The World Through Food-Colored Glasses (Social Studies/Nutrition)	7-8 years old
What Makes It Tick (Physics)	7-8 years old
Anatomy of a Hospital	7-8 years old
Dimensions (Sculpture)	7-8 years old
I Can't Believe I Wrote the Whole Thing (Creative Writing)	8-10 years old
Star Gazers (Astronomy)	8-10 years old
People, Places, and Things (Social Studies)	8-10 years old
Marine Biology	8-10 years old
Probability and Statistics	8-10 years old
Animated Films	9 and up
Seminar on the Arts	9 and up
Crafitti (Arts and Crafts)	9 and up
World Power (Comparative Government)	9 and up
Architecture	9 and up

11:00 A.M.

Potpourri	4-5 years old
"A" is for Art	4-5 years old



Friends Near and Far (Social Studies)	4-5 years old
Dinosaur Dynasty	5-6 years old
Nature Collage (Science/Art)	5-6 years old
I, Myself, and Me (Self Discovery)	5-6 years old
Fun With Music	5-6 years old
Energy Crisis	6-7 years old
Around the World (Social Studies)	6-7 years old
Over 200 Bones and 500 Muscles (Anatomy)	6-7 years old
Whirligigs, Witches, and W.I.N. Buttons (Social Studies)	6-7 years old
Your Money's Worth (Consumerism)	6-7 years old
Politics and Economics	6-7 years old
Numbers Game (Mathematics)	7-8 years old
Fine Art and Fantasy	7-8 years old
Decisions! Decisions! (Logic/Ethics)	7-8 years old
AC-DC (Electricity)	7-8 years old
2001 and Beyond (Futuristics)	7-8 years old
Arm-Chair Travelers (Social Studies)	7-8 years old
The Literary Magazine (Creative Writing)	8-10 years old
Stand Up and Speak Out (Oral Expression)	8-10 years old
Microbes — Friend or Foe	8-10 years old
Aerodynamics	8-10 years old
You and the Law (Law and Government)	8-10 years old
So You Like to Argue (Debating)	9 and up
Advanced Computers	9 and up
Chemistry Capers	9 and up
Your Project Is A What?	9 and up
12:00 Noon	
Sparks! (Electricity)	6-7 years old
Chemistry or Magic?	7-8 years old
Jumping Geography	8-10 years old
And All That Jazz (Music)	9 and up
Macro-Micro Biology	9 and up

There are two other available courses in the sciences for students of junior and senior high school age: the first is a course in electronics, with introductory and advanced sections, taught at a nearby university; the second, entitled "An In-Hospital Experience," is taught entirely at a local hospital and is, in fact, a mini pre-medical and para-medical course.

Each semester nearly one-third of the course curriculum changes; some courses are "rested" until a future date, some courses are added, some courses are deleted, and all courses are revised with fresh ideas and procedures. Even though each course is unique in itself, all courses do have certain similarities: they all encourage higher-level thought processes (Bloom 1956); they all make use of the children's ability to assimilate and retain new material easily, see relationships, understand and apply concepts, observe, abstract, form new and different conceptualizations, synthesize, and criticize; they all stress inductive learning; they all avoid routines and drills and welcome and encourage curiosity, creativity, inventiveness, independent thinking, and the desire of the children to learn rapidly while excelling at what they are learning; they all encourage development of verbal and non-verbal expressive abilities; they all capitalize on the children's long and intense attention spans, their persistent self-motivated goal-oriented behavior, their high energy, alertness, eagerness, and sense of humor, versatility, ingenuity, leadership ability, and the need for independence and time in which to pursue their learning activities at their own pace; they all refrain from restricting students to a limited number of tasks and goals and remain open-ended, though not totally unstructured, thus allowing the children to specialize and go in directions they might not have planned or

expected; and finally, they all respect the children as human beings and seek to develop in them a healthful self-attitude and a concern for the rest of humanity.

TEACHER SELECTION AT THE SATURDAY WORKSHOP

Naturally, in order for a course to be effective, enjoyable, and educationally sound, a very special kind of instructor is needed. Yet, teacher selection has been a major problem for the Saturday Workshop during its entire history because nowhere in the State of New Jersey are people specifically trained to be teachers of gifted children. Isolated undergraduate and graduate courses are periodically scheduled by the various colleges and universities but none offers a full-scale training program for teachers interested in specializing in education of the gifted. As a result, the Society has been extremely cautious in its hiring practices and has never openly advertised for teachers; rather, the Society "invites" selected teachers to join the Saturday Workshop staff.

At the present time, the Curriculum Co-ordinator has the responsibility of discovering and recruiting potential teachers for the Workshop. This is accomplished in the following relatively simple though thorough manner:

Names of prospective teachers are submitted to the Curriculum Co-ordinator from a variety of sources, including present Saturday Workshop teachers, Executive Committee members, Workshop students, Society parents, and public school administrators. The Co-ordinator contacts each recommended teacher by telephone to establish introductions and to determine whether the potential teacher is at all interested in education of the gifted. If the telephone conversation is satisfactory, (some of these educators are unavailable on Saturday while others may be hostile to special education for gifted children), the candidate is asked to submit a formal written resume. This is authenticated by the Co-ordinator and members of the Curriculum Committee. Following authentication of credentials, prospective teachers are invited to visit the Saturday Workshop, where they are more formally interviewed by the Curriculum Co-ordinator and the Curriculum Committee and are then free to observe classes, meet the students, and discuss the Workshop with veteran teachers. Upon the recommendation of the Curriculum Co-ordinator, the candidate is invited to an informal teacher-orientation meeting at which time he or she is introduced to the Saturday Workshop teaching staff and the Executive Committee. Finally, if no unexpected difficulties arise, the candidate is officially hired by the Executive Committee at its next meeting.

Over the years, the Society has learned through observation and research that not every classroom teacher could or should teach gifted children and that the most successful teachers involved in the Saturday Workshop display certain similar characteristics. As a result, when the Curriculum Committee interviews prospective teacher candidates, it looks for those qualities that it believes a teacher of gifted students needs to possess in order to be effective and successful:

1. The prospective teacher should be enthusiastic about working with gifted children.
2. The prospective teacher should have a broad cultural background with EXPERT knowledge in the specific subject area.
3. The prospective teacher should be creative and utilize a "hands on" approach to education that actively involves the students in all aspects of the learning process.
4. The prospective teacher should be flexible and willing to incorporate student ideas into the course.
5. The prospective teacher should be self-secure and not threatened by the student's ability or ideas.
6. The prospective teacher should be accessible to students in and out of the classroom.
7. The prospective teacher should be experienced at working with children, though not necessarily a teacher by profession.
8. The prospective teacher should have a good sense of humor.
9. The prospective teacher should be patient and understand the problems faced by gifted children.
10. The prospective teacher should be aware of the special learning needs and characteristics of gifted children and study the gifted child at a professional level — graduate school, in-service programs, and seminars.
11. The prospective teacher should be able to transmit enthusiasm and a love of learning that stimulates and inspires the students.
12. The prospective teacher should be able to relate to students on an individual basis — a humanistic democratic attitude.
13. The prospective teacher should possess stamina and a willingness to prepare more and work harder than is normally expected of a teacher.

While the above list of desirable characteristics was gleaned from the cumulative observations of Saturday Workshop teachers by past and present Saturday Workshop administrative personnel, and was not arrived at or tested through a rigorously conducted scientific study, it has been most helpful to the Gifted Child Society in selection of teachers. It is primarily the quality of teaching staff which has enabled the Saturday Workshop to endure and to grow.

TEACHER EVALUATION AT THE SATURDAY WORKSHOP

Once a teacher has been hired by the Society and begins teaching at the Workshop, he or she is closely observed and evaluated by the Curriculum Co-ordinator and the Saturday Workshop Evaluation Committee. The members of the Evaluation Committee are Gifted Child Society parents who are experienced professional educators and who are thoroughly familiar with the objectives of the Workshop and the qualities it looks for in its teachers. All other Society parents are prohibited from observing classes unless granted special permission to do so by the Curriculum Co-ordinator and the classroom teacher. Each teacher is observed officially for 40 minutes at least three different times per semester, no observer visiting the same teacher more than once during the ten-week period. Upon completion of an observation, the observer writes a narrative report of what he or she has seen. This report contains all information the observer feels is relevant and concentrates on whether or not the teacher and course are reflecting the general objectives of the Workshop and the special learning needs of gifted children. As soon as possible, a post-observation conference is held at which time the teacher is given a copy of the observation narrative. The teacher, observer, and Curriculum Co-ordinator then discuss the observation to determine the strong and weak points of the course, how the Workshop supervisors can better assist the teacher, and steps that can be taken by the teacher to improve his or her teaching techniques. Finally, at the end of each semester, all teachers and courses are evaluated by the Evaluation Committee and the Curriculum Co-ordinator. Teachers judged successful are asked to repeat their courses or develop new ones. Unsatisfactory teachers (there is no protective tenure) are terminated.

STUDENT SOCIALIZATION AT THE SATURDAY WORKSHOP

In addition to supplementing the educational needs of its students, the Saturday Workshop has also attempted to supplement their social needs. For many of the students attending the Saturday Workshop contact with other gifted children has been extremely limited. Compounding this is the regrettable fact that the gifted child is often faced with the problem of adult and non-gifted peer group rejection. While the child with unusually fine athletic ability is easily accepted by other children and adults, the child with unusually high intellectual abilities is slurred by misconceptions and misinformation and is frequently regarded as an outsider or even as a freak. As a result of this ignorant attitude, many gifted children are forced either to suppress their intellectual abilities or to be condemned to social isolationism. At the Workshop, gifted students are free, perhaps for the first time, to be themselves and to interact with other children of similar intellectual abilities; no one laughs at their ideas, no one admonishes them for asking questions, and no one regards them as having or causing a problem due to their brightness. Furthermore, the educationally stimulating and non-threatening social atmosphere that prevails at the Workshop seems to affect students in different though positive ways: gifted students who are withdrawn in the public school often blossom into socially active, involved individuals; gifted students who are hyperactive in the regular school classroom are often much more subdued at Saturday classes; and gifted students who have developed feelings of superiority are often, to their ultimate benefit, leveled by the realization that at the Saturday Workshop there are children as bright as they or even much brighter. Finally, at the Saturday Workshop classes many gifted students form firm friendships that carry over into the public school and often continue long after their association with the Workshop ends.

AUXILIARY PROGRAMS OF THE SATURDAY WORKSHOP

Parents of children who attend the Saturday classes and public school educators interested in the education of gifted children are not forgotten by the Saturday Workshop. Each week, as an extension of the Workshop, parents are invited to attend a discussion meeting. At this meeting, parents have the opportunity to hear and then question a

wide variety of guest speakers ranging from child psychologists to Saturday Workshop administrative personnel. Additionally, parents who attend the hour-long discussion group have the occasion to meet one another, compare problems and solutions related to their children, and share gifted child rearing techniques and "tips."

For the professional educator interested in gifted education, the Saturday Workshop sponsors a graduate-level course entitled "The Gifted Child in the Elementary Classroom." This course is taught by the Executive Director of the Gifted Child Society and deals with such questions as the following: How can programs for gifted children be established in the public school? What type of curriculum best meets the needs of gifted children? What are the most effective teaching techniques for the instruction of gifted children? What are the problems faced by gifted children in the regular classroom and how can these difficulties be minimized or overcome? Although this special course is a relatively new addition to the Saturday Workshop, it has met with tremendous success and substantiates the belief that there are many educators in New Jersey concerned with educating gifted children.

In summation, the Gifted Child Society and its educational appendage, the Saturday Workshop, exist solely to fill the void created by the lack of sufficient programs for gifted children in most of New Jersey's public schools. The Society believes that programs for gifted children should be part of the regular public school curriculum and that gifted children should be "mainstreamed" into public education rather than segregated into special schools or Saturday programs. Therefore, when the time comes that a gifted child in New Jersey can receive, in a public school setting, an education commensurate with his or her ability and special needs, then and only then will the Gifted Child Society of New Jersey happily close the doors of its Saturday Workshop.

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**THE HIGHLY PRECOCIOUS:
HOW WELL DID THEY SUCCEED?**

INTRODUCTORY REMARKS

Julian C. Stanley

The six brief articles reproduced below were written by Kathleen Marie Montour, a Mohawk Indian from Canada, at The Johns Hopkins University under the general direction of Professor Julian C. Stanley, while she was a junior and senior there. Though not presented at the Terman Memorial Symposium itself, they are in the followup tradition of Terman and his successors. Ms. Montour illustrates vividly that few child prodigies are failures as adults, especially if viewed in terms of their own perspectives on life. William James Sidis was the glaring exception of which she and I are aware. By comparing Sidis with his now-famed contemporary, Norbert Wiener, she shows that the usual assumption that parental exploitation caused the former's strong anti-intellectuality does not seem fully warranted.

Apparently, most prodigies succeed reasonably well in later life. It is difficult to prove this, however, because scientific researchers strive to preserve the anonymity of their subjects. Of course, since 1925 Lewis M. Terman and his successors have reported extensively on the progress of their large group. Unfortunately, Leta S. Hollingworth died (in 1939 at age 53) before most of her extremely high-IQ youths grew up, so the evidence about their success is fragmentary. Ms. Montour has been able to trace two of them through their careers and one of those into retirement.

She also used journalistic sources, which usually list actual names. It seems much easier to trace men than women. More of this type of follow-up research and reporting is needed in order to counter deep prejudices about brilliant youths. Most of them do not "peter out," "burn out," fail socially and/or emotionally, die young, or become adversely affected by recognition of their extreme mental ability, but many persons tend (like?) to think otherwise.

On 21 May 1976 at age 20 $\frac{1}{4}$ Ms. Montour received her B.A. degree from The Johns Hopkins University with a major in psychology, winning both general and departmental honors. She is contemplating writing a book about intellectual prodigies.

All six of these short case studies appeared originally in *ITYB* (the Intellectually Talented Youth Bulletin), published 10 times per year by the Study of Mathematically Precocious Youth (SMPY), The Johns Hopkins University, Baltimore, Maryland 21218.

CHATTERTON AND GALOIS: GENIUSES OF PRECOCITY WHO DIED YOUNG*

Kathleen Montour

In fictional works such as the Horatio Alger tales, genius is depicted as being its own source of motivation and its possessor certain to triumph in the end. Optimistic myths like these tend to engender complacency about our responsibility to nurture talent. Two of the most striking examples of the consequences of such neglect are the poet Thomas Chatterton and the mathematician Evariste Galois. Tragic circumstances severely limited their productive career spans: Chatterton, who was barely ten when he published his first poem, was three months shy of eighteen when he committed suicide; Galois, already a match for the best mathematicians in France by the time he was seventeen, was killed in a treacherous duel at twenty. Though neither of them managed to see full adulthood, by sheer heights of mental calibre and tragedy they achieved immortality.

Thomas Chatterton was born in Bristol, England, on 20 November 1752, a few months after his schoolmaster father had died and left his widowed mother to raise her impoverished family alone. Hardly any other fatherless boy born into such poverty could have managed the success he did, but Thomas had pride, ambition, and need for recognition of his superiority that had to be satisfied. Evariste Galois had these qualities, too. In the beginning though, things were financially more comfortable for Evariste. He was born on 25 October 1811 in a town near Paris (Bourg-la-Reine), upper-middle-class and the mayor's son. The respective ancestries of these two remarkable individuals give no clues as to how their genius with its sudden precocity arose. Chatterton was the descendent of a family of sextons. His mother and father were clever and talented, but his phenomenal grasp of language could not have come from their heredity. There had not been any mathematical talent before in Galois's family, either. But both his parents transmitted to him their political fervor and hatred for injustice. This, like Chatterton's pride, ultimately led to his undoing. Mysteriously and abruptly, the full force of genius set in on these willful and idealistic youths.

As is many times the fate of the latter-day gifted child, neither boy — especially not Chatterton — received the kind of educational facilitation he needed. At four Thomas was called a confirmed dullard until some brightly

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colored capitals in one of his father's folios caught his eyes and he was willing to learn his letters. His mother, realizing her son's dislike for primers, taught him to read with a black-letter Bible whose medieval script awakened an enduring love for antiquity in him. The former dullard now read constantly. At the age of eight he was sent to a charity school, Colston's Hospital, whose monkish blue uniform delighted the little antiquarian. But its rudimentary curriculum had been conceived to instill conformity and was entirely unsuitable for Thomas. He was not taught the classics, i.e., Latin and Greek, so he could never qualify to enter a university, an impossibility anyway, since Colston's did not even supply scholarships. The little Bristolian supplemented this dry regimen by spending his pocket money to borrow books; between the ages of ten and eleven Thomas read at least seventy books on theology, philosophy, divinity, and history, certainly not the usual boyish fare. By now his Muse, versifying, had seized him. When he was ten years and two months old his first poem, the pious *The Last Epiphany*, appeared in *Felix Farley's Journal*. With money provided by Colston's, his mother apprenticed Thomas to a scrivener when he was fourteen. Instead of writing poetry, he was condemned to spend his days copying documents.

Galois' educational picture was brighter at its start but stayed that way only briefly. Until he was twelve he was tutored at home by his mother, a woman with an excellent classical education. He was then sent to the lycée Louis-le-Grand in Paris. At first a good and dutiful student, he took all the prizes, but this changed when he saw real tyranny for the first time as the school director mercilessly put down a student uprising. The boy was embittered against authority for good. But the awakening of his mathematical genius was the greatest influence on his fate. Evariste's first exposure was to Legendre's geometry, not just an ordinary text but elegant mathematical writing. It took good students two years to master Legendre, but he read it from cover to cover as easily as a novel. With Legendre under his belt young Galois could not be satisfied with mere schoolbooks from which to learn algebra, so he read the original works of the best mathematicians of France. By the time he was fourteen he had mastered algebra at the level of a mature mathematician while his peers plodded along at the basics. His teacher, Richard, who had given France some of its best mathematicians, realized that the brilliant young pupil's thoughts inhabited the highest reaches of mathematics, but the other teachers, petty and threatened by his genius, insisted that he comply with a curriculum he rightly viewed as inadequate. Instead of giving him freedom to explore mathematics, they piled more and more onerous tasks on the recalcitrant youth.

Evariste knew there was only one place he belonged, the famous Ecole Polytechnique; not only would it serve his gift but also politics, for the Polytechnique was a hotbed of republican sentiment. He was already making significant mathematical discoveries from the time he was seventeen and had published his first paper, one on continued fractions, on 1 March 1829, so no one deserved to be there more than he did. Because of his quirk of working mentally, though, he made a poor showing on the entrance examination, failing it twice, and was never admitted. Even more frustration buffeted the poor boy. Twice his submissions to the Academy of Science were carelessly lost by referees, the great mathematicians Cauchy and Fourier. To the boy who was already beside himself by not winning recognition, it must have seemed like a conspiracy to keep him down. Then his father committed suicide over something done to him by his political enemies. After the Revolution of 1830, Evariste's sharp pen got him expelled from the university at the age of nineteen. He tried to support himself by giving private lessons on what are now considered important ideas in algebraic theory, but had no takers then. His last desperate attempt to receive his due in mathematics from the Academy was returned by Poisson with the comment, "Incomprehensible;" it is now the Galois theory or the general solution of equations. He now had had enough from hated academicians and society in general. Feeling oppressed because he could not get anywhere with his mathematical genius, he turned away from it and devoted his energy to radical politics instead.

Thomas Chatterton fared badly in Bristol. For all his talent and charm, the lowly apprentice knew that the gentry would not accept his poetry for its real worth because it came from him. So he invented the fifteenth century poet-priest, T. Rowley, and presented as the work of Rowley his own productions ingeniously disguised by elaborate forgery. He searched, without success, for a patron who would bring him quick wealth and acclaim. A group of Bristol men brought the clever youth into their society, lending him books and giving him stimulating company, but they exploited him by taking his "Rowleys" for a fraction of their worth. In retaliation, Thomas published stinging satiric poems attacking their personalities. Having alienated the locals, he tried to interest Horace Walpole by corresponding with the famous critic and sending him Rowleys. The vain aristocrat was flattered and praised Thomas' efforts until the boy confessed he was only a poor sixteen-year-old apprentice, whereupon Walpole

dropped him flat. Chatterton thought his situation was so grim that suicide seemed to be the only escape from his dismal surroundings. Twice Thomas left suicide notes lying out to be found. His master, Lambert, fearing a scandal, let Thomas out of his indenture. The boy was glad to win his freedom from Lambert, who had the effrontery to treat the haughty boy like a servant.

Thomas' writing was published in many London journals; for this he got many promises but little remuneration. At the age of seventeen, with borrowed money, he set off there to make his fortune. The great city was very receptive at first. He had money with which to send presents home. He mingled with more exciting people than he had ever known in Bristol. He had contacts with influential political editors and was even acquainted with Lord Mayor Beckford. But the political winds changed, and his publishers were imprisoned. Things became steadily worse after that. Beckford died suddenly. Thomas was not paid money owed him for his writing, so he could not pay his small but insurmountable debts. His last hope was that his Bristol surgeon friend, William Barrett, would recommend him as a ship's doctor because of his small knowledge of medicine, but Barrett refused. Thomas had nowhere else to turn, and everything had gone wrong. In his last few days, with no money for food, he was actually starving. He was still only seventeen when he took his life with arsenic.

In his own lifetime Evariste received more acclaim as a patriot than he ever did as a mathematician. At the time he wrote the memoir unappreciated by Poisson, he was a member of the artillery of the National Guard, which called itself the "Friends of the People." He was arrested twice, once for threatening the king and the other time on a trumped-up charge. It was only on the second that he was actually put in prison, but the government now regarded him as a dangerous revolutionary. This short stay in prison was highly traumatic for the proud, sensitive youth. After his release he fell in with an "infamous coquette" who disillusioned him with love. Unfortunately, this failed affair was part of a plot to lure Evariste, frail and nearsighted, into a duel against two men. Knowing he would lose, Galois frantically scribbled down his ideas so that future mathematicians might decipher his writings and so allow his theories to survive him. The next day the young duelist, wounded in the intestines and left to die in a field, was found and brought to a hospital. On May 31, 1832, the twenty-year-old youth succumbed to peritonitis. A few days later he was given a heroic funeral for his patriotism, his mathematical genius being overlooked by the mourners. The life of this tormented pioneer of algebraic theory was so brief that the work he left behind amounted to only sixty-one pages. Some of the last words he wrote were: "Preserve my memory, since fate has not given me life enough for the country to know my name."

Why were these unbelievably talented youths tormented throughout their short lives? It may have partly been because their characters were flawed by arrogance, but that was their reaction to the conditions caused by the precocious onset of their brilliance. Because their thoughts dwelt in loftier regions of the intellect than their companions would ever know, Thomas and Evariste had to face greater adversity than any of their age-mates. Seething with ideas and impatient to get them down, they foreswore the fellowship of boys to take on men. With no one to help or direct them, they had to fight adult antagonists in their territory with the brains of geniuses but the emotions of boys. The academicians, examiners, and government agents overwhelmed Galois, and Chatterton was ill-used by Walpole, the Bristol Elders, and Lambert. Continual frustrations that would have broken almost any grown man drove these brilliant boys to despair and ultimately ends. And so they were lost to society before their genius came into full flower.

SUCCESS VS. TRAGEDY: WIENER AND SIDIS*

Kathleen Montour

One of the popular myths regarding talented youths is that they burn out early, declining into unhappy obscurity after a brilliant and precocious beginning. Even with Terman's extensive research on gifted children disproving this idea, it unfortunately is still all too evident. The name most often mentioned in connection with this popular misconception is William James Sidis.

William Sidis was both a brilliant and maladjusted young man who completed his baccalaureate at Harvard while still 16 years old. As a mere baby he would amuse himself by spelling words with toy blocks. One woman tested him by spelling out "Prince Maurocordatos, a friend of Byron," and asked the baby a week later to give her the name of Byron's friend. William did this with ease. But already his inability to cope with everyday life was showing itself, too. On one occasion, after having read on the menu that breakfast was to be served from 8 to 9 o'clock, he had to be carried away shrieking when he was brought to be fed at 7:45. He knew algebra, trigonometry, geometry, and calculus by age 10 and was finally admitted to Harvard at age 11 after being refused at age nine because he was thought to be too young.

At Harvard young Sidis was said to have begun by specializing in a mathematical topic called quaternions. In January of 1910 he gave a lecture about "Four-Dimensional Bodies" to professors and advanced graduate students in mathematics. Still, his phenomenal accomplishments were tempered by his social ineptitude. He would distract a class whenever he was bored and had been rude to his questioners when he gave his famous lecture.

Though extremely troubled otherwise, William always seemed to be able to cope intellectually — he was granted his A.B. cum laude in 1914. But, as he grew older, interviews showed him to be quite warped in his outlook. He refused ever to consider marrying and thought being totally cut off from people was the perfect life.

Sidis spent a year at Harvard in graduate school and three years in the Law School without ever taking a degree. He later wrote two books before dropping out of sight. When he resurfaced in 1924, it was now as a routine

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computational clerk, whereas he had once been an instructor at Rice Institute.

Sidis always expressed great animosity towards his father for parading his accomplishments and having him branded as a freak. As a result, he strenuously avoided academic life and all publicity until his death in 1946 at age 46. Although it meant dying penniless and alone, Sidis managed to thwart his father's aim to produce the ideal man in his son.

We do not detail here the unhappy life of William Sidis as a proto-typical example of the burnt-out prodigy. On the contrary, William Sidis, often taken as the norm, was a notable exception. Sidis is the only celebrated prodigy who we know failed almost totally intellectually and vocationally. We do not know how he might have turned out with far less parental pressure. Children of his extreme cognitive ability need much thoughtful loving help in order to develop well intellectually and personally.

In a sharp contrast to the tragic image of Sidis is that of his contemporary, Norbert Wiener, who received his bachelor's degree from Tufts College when he was only 14 years old and his Ph.D. degree in mathematical logic from Harvard University four years later. He also had a prominent, demanding father, but managed in later life to overcome the parental pressure. Wiener was happily married for many years and a well-respected leader in his fields. He helped found cybernetics and, in fact, invented the word. Cybernetics is the science of the principles underlying the common elements in the functioning of automatic machines and the human nervous systems. It deals with the theory of control and communication in machines and organisms. The Greek word *kybernetes* means steersman or pilot. Dr. Wiener had a long and rewarding professional life at MIT. He died in 1964 at age 69, famous enough to be listed in the 1968 edition of *Who's Who in Science*. Wiener wrote two autobiographies, one dealing with his childhood and the other with his later life (Wiener 1953, 1956). It is both interesting and illuminating to study these books for clues to his gradual maturation (he did not become even an assistant professor until age 30) and eventual intellectual development. Both of them are well written and entertaining. The former will appeal more to parents and their intellectually talented children. The latter will appeal more to those interested in applied mathematics, computer science, and electrical engineering. Again, Norbert Wiener's successful life is but one example that the tragic story of William Sidis is fortunately neither inevitable or common.¹

¹For a fuller treatment of Sidis's life, see Montour (1977).

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PHILLIPA DUKE SCHUYLER*

Kathleen Montour

In 1940 Phillipa Schuyler was nine years old, but according to the Clinic for Gifted Children at New York University she had the mental age of a sixteen year old, which meant that her IQ was 185. At that age she read Plutarch for fun, wrote poetry dedicated to her dolls, and had composed more than 60 piano pieces. The little girl who had a contract to create new compositions for an NBC radio program was generally acclaimed as a genius, but her parents disagreed. To George S. Schuyler, a black journalist and former H. L. Mencken protégé, and his wife Josephine, the daughter of a white Texas banking family, their child's precocity was largely due to the special diet of uncooked meat and other raw foods she was raised on.

Whatever the reasons for Phillipa's achievements were, her parents succeeded in helping her to grow up right and begin an eventful career (perhaps partly by the way in which they kept her unaware of the publicity she received). Phillipa graduated from her convent elementary school when she was ten, and was educated at home after that so she wouldn't feel out of place. The girl liked to describe her experiences with music, and became well-known as a pianist and composer. She was placed on the National Guild of Piano Teacher's honor roll after she entered their tournament at age four and played 10 compositions, six of which she herself had written. She was so popular that when she was nine a day in her honor was proclaimed at the New York World's Fair. At age fifteen she made her professional debut as a pianist-composer in the Lewisohn Stadium with the Philharmonic Symphony Orchestra.

When she grew up, Miss Schuyler also became a journalist. While serving as a foreign correspondent for the Manchester (N.H.) Union-Leader in 1967 at age 35 she died in a helicopter crash in Viet Nam. By then she had written a book on her experiences in Africa and was due to speak about international relations before the Women's Press Association. Shortly after her death a foundation was created in the memory of this versatile woman.

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TWO MEN WHO AS BOYS WERE CELEBRATED QUIZ-PROGRAM CONTESTANTS*

Kathleen Montour

Back in the Forties, there was a program on the radio called the "Quiz Kids." It featured a succession of knowledgeable bright children from the Chicago area who demonstrated their phenomenal range of information. The "Quiz Kids," some of whom were as young as six, knew so much about topics as vastly apart as mathematics and literature that they sorely taxed the ingenuity of the adult question-writers to find questions difficult enough for them. Two contestants, Joel Kupperman and George Van Dyke Tiers, stood out as answering mathematical questions particularly well. What vocations they eventually chose to follow are rather interesting.

Joel Kupperman, who was called a "midget Euclid" by *Time* magazine (*Time* 1943), reportedly had an IQ over 200 and was able to hold his own with older contestants when he came on the show at age seven. In an effort to keep him in a grade lockstep with his peers, Joel was given special work. Somewhere along the line, however, he opted to accelerate his school progress. He got his A.B. (Bachelor of Arts) degree from the University of Chicago at barely eighteen, an S.B. (Bachelor of Science) degree a year later, and a master's degree the following year. He went to Cambridge University to study philosophy and received his Ph.D. in 1963 at age 27, after taking a couple of years off. He was made a full professor at the University of Connecticut in 1972 at age 36. He has a number of publications in his specialty, ethics and aesthetics.

In the opinion of *Life* magazine (*Life* 1940), George Van Dyke Tiers was also something of a prodigy. He took his S.B. degree at age 19, his S.M. (Master of Science) at age 23, and his Ph.D. at age 29, all from the University of Chicago. He had a Coffin fellowship during his graduate study years and received the Carbide Award of the American Chemistry Society in 1959 at approximately age 32. He has been a research associate with the Minnesota Mining and Manufacturing Company since 1951.

The examples of Kupperman and Tiers demonstrate that early quickness with numbers and mathematical formulas will not force its possessor into a career in mathematics. Of course, we do know how excellent these two

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boys were in mathematical reasoning itself. Quiz programs tend to put great stress on fast recall and use of isolated facts, rather than on deep analytical ability.

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MERRILL KENNETH WOLF: A BACHELOR'S DEGREE AT 14*

Kathleen Montour

In September of 1945 Merrill Kenneth Wolf of Cleveland, Ohio, became quite possibly the youngest American ever to receive the baccalaureate when he took his B.A. in music from Yale College at the age of barely fourteen (his birthdate was 28 August 1931). Because Yale was on a special accelerated schedule during W. W. II, Wolf completed his degree requirements in less than the usual number of academic years.

Prior to his Yale career, Wolf had a most amazing development history, being highly precocious both verbally and musically. When he was an infant of only four months he began to speak his first words. At the age of six months he said his first full sentence, "Put on another record." In a personal communication to the writer dated 3 February 1976, Dr. Wolf explained the context of this remark: "Phonograph recording was still a very imperfect technique in 1931, and the pianola, which we now think of as a saloon accessory, was an important medium of classical musical reproduction. It was another pianola roll I was asking for, and the device served as my first — in some ways, my best — piano teacher. About a year and a half later, my mother discovered me playing the piano myself, and apparently imitating tolerably well what I had seen the mechanical device do in the way of depressing given keys to obtain given sounds. Confronted with this, my father taught me to read music, and lessons with a professional teacher then followed, at age 3." By this time his non-musical education had commenced; his father was using flashcards printed with whole words, not just letters, to teach the baby how to read. On his first birthday Kenny was given a first-grade reader, for which he was by then ready.

When he went to school for the first time at the age of six he was placed in the sixth grade. On his first day of school his classmates were being given a final examination, which the little boy took and easily passed. His presence disrupted the class, however, and therefore his parents were asked to take him home. When he was eight he found the junior high school mathematics class he was attending so boring that he lasted only two days before asking to be kept home.

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Until he was ten, his education was continued at home. Then he was given a standard college entrance examination and was accepted by Western Reserve University (now Case Western). Among the three subjects he ended up taking was an elementary college chemistry course for which he had prepared himself by reading chemistry textbooks for amusement. But young Wolf's interests really lay in the direction of music. He played the piano from the time he was a baby and wrote his first symphony when he was eight. In March of 1944, when he was 12½ years old, Kenneth and his mother went to New Haven, Connecticut, so that he could study music at Yale University under Paul Hindemith; he became a Yale sophomore at twelve. There, the Ohio boy learned musical composition. For his final thesis, thirteen-year-old Wolf wrote a 170-page septet for piano, two violins, viola, cello, clarinet, and French horn. After Yale, he studied privately for four years under the great pianist Artur Schnabel, an influential pioneer in the esthetics of performing classical music.

In 1952, at the fairly typical age of 21, Kenneth Wolf decided to make medicine his profession and entered the Western Reserve University School of Medicine. He took his M.D. degree from there in 1956 and was the recipient of that school's Steuer Award in Anatomy. He then went to Boston, Massachusetts, where he interned at the Peter Bent Brigham Hospital. Dr. Wolf became a teaching doctor and worked up the ladder to become an associate professor at the Harvard Medical School. Now a professor of neuroanatomy at the University of Massachusetts Medical School and a lecturer on neuropathology at the Harvard Medical School, he has a substantial list of publications to his credit.

Although Dr. Wolf views himself as primarily verbally and musically talented (saying that he never progressed beyond a B+ in elementary calculus), he is an enthusiastic supporter of SMPY. He has graciously allowed SMPY to cite his example many times when describing the adult outcomes of precocious children because he is happy to see the renewed interest in the gifted that SMPY symbolizes, "considering the human waste that is involved when the people at the other end of the spectrum (the gifted) drop out and are lost to the system. . . ."

[For documentation of some of his statements in this article see pages 316, 318, 327-29, 331, 334, and 335 of Keating (1976).]

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CHARLES LOUIS FEFFERMAN: YOUNGEST AMERICAN FULL PROFESSOR?*

Kathleen Montour

Charles L. Fefferman appears to be the youngest person in recent history to be appointed a “full” professor at a major university. Fefferman was born in Washington, D.C. on April 18, 1949, which means that when he became a full professor of mathematics at the University of Chicago in 1971 he was only 22 years old. To have achieved this honor at the age when most students are only receiving their baccalaureate, Fefferman had to have been both extremely precocious mathematically and high accelerated educationally.

Fefferman first showed a strong interest in mathematics when he was around nine years old. At that time he had begun studying science independently, but found that his rudimentary arithmetic would not explain college-level physics. His father, a Ph.D. in economics, taught his son as much mathematics as he knew. Very soon, however, it became necessary for a University of Maryland mathematics professor, James Hummel, to take over the boy’s tutoring. As a junior high school student, Charles won a regional science fair with his mathematics exhibit. By the time he was 12 years old he was taking courses at the University of Maryland campus near his Silver Spring home. At Hummel’s urging, Charles bypassed high school and entered college as a full-time student at 14 years of age.

As a student at the University of Maryland, Fefferman combined his studies with an active, normal life while making the first strides that would lead to a phenomenal career. He lived at home, socializing with friends still in junior high school, and yet found time to write his first scholarly article (this appeared in a German journal when he was 15). In 1966 he became the youngest student in the University of Maryland’s history to receive a bachelor’s degree. The barely seventeen-year-old youth had majored in both mathematics and physics. At the ceremony he was also awarded his high school diploma.

In 1969 Fefferman received his Ph.D. degree in mathematics from Princeton University shortly after his 20th birthday and stayed on there a year as a mathematics instructor. Subsequently, he became an assistant professor on

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the University of Chicago's faculty in 1970. In 1971 he won the Salem Prize for his outstanding work in Fourier analysis. That same year, one year after his appointment as an assistant professor, Fefferman was promoted to the rank of full professor. Fefferman has since returned to Princeton as a full professor of mathematics. In 1976 at barely age 27 he became the first recipient of the \$150,000 Alan T. Waterman Award of the National Science Foundation.

In comparison to this outstanding record, first-rate mathematicians seldom receive the Ph.D. degree before ages 24 to 26. To work through the ranks of assistant and associate professor to "full" professor usually takes until they are in their 30's. Even the famed cyberneticist Norbert Wiener had not become an assistant professor (at M.I.T.) until he was 30, though a Ph.D. degree in mathematical logic was awarded to him by Harvard University when he was only 18. Also, few of even the ablest scientists win as many top awards in a lifetime as Fefferman had already done by age 27.

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