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The Superior Pupil in Junior High School MATHEMATICS

by

Earl M. McWilliams
Allderdice High School
Pittsburgh, Pennsylvania
and
Kenneth E. Brown
Office of Education

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Marion B. Folsom, Secretary

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FOREWORD

ARE public junior high schools making adequate provision for the superior pupil? What are some of the practices used in junior high schools to provide for the educational needs of talented youth? What administrative procedures are used to identify these children? What enrichment techniques have mathematics teachers of heterogeneous classes found especially useful in teaching the superior pupil?

To secure information bearing on these and similar questions, the authors selected junior high schools in various geographic regions of the United States and then visited them personally. This publication is based on the authors' survey.

It should not be inferred from this study that the educational needs of the average and the slow pupil are being met adequately nor that the procedures described are applicable only to the superior pupil. Perhaps many of the provisions for the latter will suggest appropriate techniques to be used for the former. In any case it is hoped that this publication will be helpful to teachers who are aware of the many ways in which their pupils differ.

WAYNE O. REED
Assistant Commissioner
Division of State and
Local School Systems

J. DAN HULL
Director
Instruction, Organization,
and Services Branch

THE SUPERIOR PUPIL IN JUNIOR HIGH SCHOOL MATHEMATICS

Need for Developing the Superior Pupil

No doubt the Nation's specialized manpower is responsible for the fact that, with only 6 percent of the world's land and 7 percent of its population, the United States produces 40 percent of all electric power, has 50 percent of the world's telephones, and drives 76 percent of its automobiles.[1]

In 1850 machines supplied only a little more than 5 percent of America's industrial power while today they supply about 85 percent. The days of animal and human muscle power are fast disappearing. To this change one of the greatest contributors has been the engineer. The number of engineers has increased fourfold since 1900. Similar increases have been made in other scientific professions. It is estimated that today we have a million and a half "brain workers"[2] such as engineers, scientists, doctors, teachers, lawyers, architects, editors, and social scientists.

Can the United States continue this rapid increase of its supply of specialized personnel? To obtain a partial answer to this question, one has only to look at the shortages now evident in professional manpower. The more recently publicized shortage has been in engineering. The number of engineering graduates in the United States up to 1960 will be about 177,000 compared to an estimated need of about 240,000. Shortages of at least 50,000 registered nurses, 35,000 medical doctors, and 293,000 qualified teachers are also forecast for 1960.[3]

If one looks at our Nation's elementary and secondary schools to study the potential supply of professional personnel, one finds 35 million children. If the future is to be judged by the past, about 50 percent of those now in the fifth grade will complete high school and of those high-school graduates with requisite mental ability, only about one-half will go on to college.[4] Many of the students who go to college will not have had high school courses to qualify them for

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[1] *Centennial of Engineering: 1852–1952*, (Lenox R. Lohr, editor), Chicago, Museum of Science and Industry, 1953.

[2] Wolfle, Dael, Intellectual Resources, *Scientific American*, 185, C: 4–8, September 1951.

[3] Armsby, Henry H. Scientific and Professional Manpower—Its Supply and Utilization. *Higher Education*, 11:23–24, October 1954.

[4] *America's Resources of Specialized Talent*, The Report of the Commission on Human Resources and Advanced Training. Prepared by Dael Wolfle, Director. New York: Harper & Bros., 1954. p. 314.

scientific study even if they desire to pursue it. For several years the percentage of pupils enrolled in algebra and geometry[4] in the Nation's secondary schools has decreased. Moreover, it is estimated that between 1934 and 1953 the actual number of pupils in geometry—a mathematics course usually required for college entrance—decreased slightly. A recent study showed that only about one pupil out of ten takes solid geometry and trigonometry, the courses normally required of pupils who expect to enter scientific fields.[5]

The demand for professional personnel has increased twice as rapidly as the increase in population since 1900. The rate of increase in demand is actually 5 times for engineers and 10 times for scientists. The number of high-school and college students enrolled in scientific courses indicates that we cannot maintain this rapid increase in the production of scientific manpower. Further data to substantiate this conclusion have been compiled by Dael Wolfle in the Report of the Commission on Human Resources.[6]

This outlook for a shortage of specialized personnel presents a special challenge to develop to a maximum the superior pupil.

Superior Pupil Defined

"What do you mean by the term 'superior child'?" If this question were asked of persons who are interested in the welfare of children, the answer probably would be a description of an intellectually talented child. Only occasionally would one find a person describing a child gifted in music, art, or salesmanship. For example, in the Long Beach public schools the superior pupil is not selected because of his superiority in musical, artistic, or mechanical ability nor because of his leadership in his age group. He is selected because of his intellectual superiority as measured by tests of general intelligence and/or reading comprehension. This procedure or a similar one is also used by many other schools.

The superiority of a pupil may be due solely to some special inherited single ability or it may be due to a pattern of tendencies plus rich educational nurture. In any case the junior high school teacher has neither time nor facilities to study single primary abilities even if they exist. The teacher can at most only locate those pupils with a potential in broad areas of learning such as mathematics, social studies, or natural science and motivate the children to study further in these areas.

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[4] Brown, Kenneth E. *Mathematics in Public High Schools.* Washington: U. S. Government Printing Office, 1953. (Office of Education, Bulletin 1953, No. 5) pp. 23 and 24.

[5] *America's Resources of Specialized Talent*, The Report of the Commission on Human Resources and Advanced Training. Prepared by Dael Wolfle, Director. New York: Harper & Bros., XVIII+332 p. $4.

The superior pupils to whom we refer in this discussion are the rapid learners in academic subjects. They are the pupils in the upper 20 percent in general intelligence whose abilities lend themselves readily to intellectual pursuits.

Source of Data for the Study

The primary source of data for this study was visits to classrooms in junior high schools from Maine to California. Dr. McWilliams, one of the authors, spent the academic year 1953–54 visiting more than 80 junior high schools. These visits were made possible by a grant from the Fund for the Advancement of Education. He studied the methods that the schools were using to identify the superior pupil and the provisions they were using to develop the pupil's mathematical ability.

The schools in this study are not a sample of American junior high schools selected at random. Rather they were selected because of their educational provisions for the superior pupil. This does not imply that all schools with promising practices for the development of superior junior high school pupils were visited. In fact, neither time nor money permitted visits to all these schools.

Before deciding what schools to visit, the authors secured names from several sources. Two questionnaires prepared by the Office of Education and requesting data about the school's program for the superior pupil, were sent to 1,200 schools. Although the data were used in other studies,[7] they furnished the names of many schools with promising practices for the education of the superior pupil. A study [8] of currently used curriculum guides in mathematics in the junior high schools in the United States revealed that many schools are making special provisions for the superior pupil. Correspondence with mathematics consultants in State departments of education and mathematics counselors in teacher-education institutions also provided a valuable source of names of schools that are developing the pupil who has a high potential in mathematics.

From the various sources described above, the authors compiled a master list of schools, 140 of which they were able to visit.

Purpose of the Report

This report presents ways to identify the superior pupil and methods to provide for his needs. It gives the names of many schools as examples of institutions using the procedure described. The reader

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[7] Brown, Kenneth E., *Mathematics in Public High Schools.* Washington: U. S. Government Printing Office, 1952. (Office of Education, Bulletin 1952, No. 5.) Secondary Schools Section, *Teaching Rapid and Slow Learners in High Schools.* Washington: U. S. Government Printing Office, 1954. (Office of Education, Bulletin 1954, No. 5.)

[8] Brown, Kenneth E., *Curriculum Materials in High-School Mathematics.* Washington: U. S. Government Printing Office, 1954. (Office of Education, Bulletin 1954, No. 9.)

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should not conclude, however, that any procedure is used only by the schools named nor that these schools are the most outstanding schools using any particular method. In most cases the fact that the authors recently visited the schools is the reason why a particular institution is cited as an example. The authors do not assume that any of these schools will be used as models nor that the entire procedures of a school will be adopted in a new situation. However, some elements of programs described may be helpful to local schools planning similar programs. No standard formula can be applied in all schools; hence, the procedures described should only suggest ideas for further study by local school staffs. The authors have in fact written their bulletin for this purpose.

Classroom Provisions in Mathematics for the Superior Pupil

One of the first tasks of the junior high-school teacher and administrator is, of course, to identify the superior pupil. Nevertheless, we shall wait to discuss this topic in a later section of this publication and proceed at once to consider some of the classroom provisions for the superior pupil that we observed in many classrooms throughout the United States. Educators may disagree on ways of identifying the superior pupil and the type of organization best suited to fill his needs, but they do agree that an essential factor in the program for the superior pupil is classroom enrichment to provide an opportunity for giftedness to develop.

Enrichment

The term enrichment usually implies supplementary educational experiences to develop the child to a maximum. Sometimes the enrichment is vertical: for example, a superior pupil is taught topics in mathematics that he would normally study 1 or 2 years later. At other times the enrichment is horizontal: for example, a superior pupil is taught applications of mathematics that he might not normally study at all. In any case, the enrichment varies from school to school and from teacher to teacher. Perhaps this is necessary since pupils differ so markedly in background and mathematical potential. Individual pupil differences are not entirely eliminated in any of the pupil groupings observed.

In classrooms containing only the upper 5 or 10 percent of the student body, teachers occasionally said, "If I didn't have John or Mary, this would be a good class. He or she is a little slow." The same relative individual differences also appeared among the slow groups. Teachers of groups of pupils with I. Q.'s of 70 and below

remarked, "The class is rather slow, but John or Mary isn't too bad." No matter how thin the homogeneous groups are sliced, there is still a top and bottom. No group of junior high-school pupils is so homogeneous that individual differences do not exist. Therefore, the ideal enrichment for the most homogeneous group will vary not only from class to class but from pupil to pupil.

Any observer who goes from school to school soon learns that the answer to the question as to whether or not enrichment is taking place lies within the individual classroom. School organization, grouping, in-service aids to teachers, guidance, or even the school philosophy does not insure enrichment nor completely stifle it. If the teacher of the superior has the ability to help children create a good learning environment, within that classroom there will be a high potential for enrichment.[9] However, for all classroom procedures to be most effective teachers need full administrative support.

Additional exercises and supplemental problems.—Although enrichment may lend itself more readily to some areas of learning than to mathematics, it is not ignored in mathematics instruction. One of the most common procedures is to assign additional exercises and supplemental problems to the superior pupil. Mathematics teachers at the junior high school in San Diego and Lafayette Junior High School in Los Angeles appeared to be successful in providing additional problems for the rapid learner. In San Diego extra worksheets were provided with supplemental problems.

The authors of textbooks have made this procedure convenient for the teacher by including many exercises and problems that are starred or in some other way identified as difficult material. In many cases the problems are thought-provoking and increase the depth of understanding. At times the problem may encourage the pupil to study more advanced material. In a few cases the additional exercises probably involve repetitions of skills already acquired by the superior pupil. A selected group[10] of mathematics teachers who were reported to be successful with superior pupils indicated that extra drill problems were used frequently in providing for this type of pupil. However, it is doubtful that superior pupils need additional drill on routine skills or that drill enriches their programs.

Some schools have prepared special resource units that emphasize mathematical concepts rather than additional drill on the manipulative operations. For example, the teachers of Oregon public schools have resource units on such topics as *Measurement* and the *Circle*

[9] *Creating a Good Environment for Learning.* Washington, D. C.: Association for Supervision and Curriculum Development, National Education Association, 1954. Brundage, Erwin. Teaching the Individual Adolescent. *Educational Leadership*, 11: 147–151, December 1953.

[10] *Teaching Rapid and Slow Learners in High Schools.* Washington: U. S. Government Printing Office, 1954. (Office of Education, Bulletin 1954, No. 5.)

which they have found to be valuable supplementary material. Those who prepare such resource units point out that new concepts enrich the superior pupil's experience more than "extra" problems in the textbook even though the problems involve unusual computation and reasoning. Those who use the textbook "extra" problems are quick to point out, first, that in many cases the resource units only introduce material which the pupil will normally encounter later in school and second, that, it is better to stress horizontal enrichment rather than vertical.

Oral and written reports on mathematical concepts or about men of mathematics give an opportunity for the superior child to develop individual interests and express his ideas and findings. Introducing such reports into a class for purposes of discussion and criticism can be most helpful to the teen-ager. Many teachers attempt to broaden the pupil's background by giving him a list of topics from which he can make a selection. The pupil explores the topic by reading a book or magazine and then writes a report or gives it orally.

Individual and small group projects.—In providing for the superior pupil in mathematics many teachers have found individual and small group projects exceedingly valuable. Even though the entire class does not participate, the project should be related to the unit on which the class is working. For example, an algebra class may be studying systems of equations of the type, $\frac{1}{x}+\frac{1}{y}=k$. One of the superior pupils may, during a pupil-teacher planning conference, decide to make a chart on mechanical devices for solving such equations. His experience in doing this will extend his knowledge of algebra. Also his explanation of his chart or device may motivate and encourage other students. Since his project is directly related to the work of the class, he does not isolate himself from his peers. The other pupils see his project not as "busy" work, but as a direct contribution to the class goal.

The differences in interests and background among superior pupils require that the teacher be familiar with many possible areas of exploration. Fortunately the literature in mathematics and science education is rich with project suggestions. A visit to a few classrooms will reveal the many and varied projects that classroom teachers are using. Something of this great variety can be gleaned from the projects described in the following paragraphs.

The eighth grade arithmetic class at the Walnut Hills High School in Cincinnati, Ohio, set up a weather bureau and operated it. The function concept took on new meaning through weather data graphs. Also at this school, superior pupils made models for use in the mathematics classes. At the Bronxville Public School in Bronxville, N. Y.,

the seveth grade science pupils had a zoo containing a large collection of birds, fish, reptiles, insects, and mammals. Part of their regular class work also included experiments with rats and mazes.

In San Diego the ninth grade pupils selected a radio project. Similar projects were used in Santa Barbara to enrich the instruction of the superior pupil. A science museum of pupil-made models is managed by pupils of the Halsey Junior School (No. 157), Forest Hills, N. Y. Pupils here also collected, mounted, and cataloged a collection of pictures pertinent to the science course.

In other schools one will find the superior pupil constructing model laboratory apparatus and teaching aids such as a probability board. He may collect statistical data about the school or community and interpret it in mathematical terms to the class. He may determine through extensive reading the vocational areas in which a knowledge of high-school mathematics and science is essential and present the information to the class.

A superior pupil having artistic interests may show the development of measurement through a mural, or the importance of a specific mathematical idea through a poem. A pupil's participation in the construction of charts and models may stimulate his interest and enrich his mathematical understanding. The public schools at Oak Ridge, Tenn., and Seattle, Wash., have used this type of enrichment successfully in a number of subjects. The variety of such projects is limited only by any limitations placed upon the imagination and judgment of pupil and teacher.

Some of the projects and supplemental problems used for enrichment are done during a study period, but many superior pupils have 5 or 6 subjects which require that some assignments be done at home. Schools occasionally secure the opinion of the parents as to the amount of homework that should be assigned. This may be done by informal discussion in a PTA meeting or by a questionnaire to the parents. Superior pupils can make a valuable contribution in planning the questionnaire and in collecting and tabulating the data. A sampling survey made by a Denver school revealed that 21 parents believed there was excessive homework, while 64 thought the amount was just right. Although surveys of this type may not provide conclusive data they can contribute to better communication between parents and teachers. For the most effective results to accrue from special homework, parental understanding is highly desirable.

Individual and group projects have been helpful in motivating the superior pupil not only to greater achievement in mathematics but also in many cases to greater achievement in other subjects. For example, a mathematics teacher in Chattanooga, Tenn., was successful in finding projects of real interest to some of the "problem" pupils

whose achievements were not commensurate with their abilities. As their interest and achievement in mathematics increased, a similar increase occurred in their other subjects.

Vocabulary study.—Many teachers make a special effort to assist superior students in learning vocabulary or reading skills peculiar to mathematics. A recent survey [11] of teachers recommended as successful with rapid learners in mathematics, disclosed that these teachers rank this technique first among all techniques for rapid learners.

Lafayette Junior High School, Long Beach, Calif., is an example of a high school where many of the teachers stress the importance of a mathematics vocabulary. In many classes, lists of new words were being studied and pupils were learning to spell the words that they would use most frequently. At staff meetings teachers pool their ideas on how to teach both spelling and meaning of these words. Thus an attempt is made to improve the mathematics reading program. A recent tentative teaching guide prepared by a group of teachers in the St. Louis public school system, gives considerable emphasis to vocabulary study.

Many recent textbooks include, at an appropriate place in the texts, lists of new words with suggestions for vocabulary study. The newer texts attempt to keep enough of the vocabulary within the pupil's experience to facilitate understanding and at the same time to include new words to provide intellectual growth and challenge. One teacher in Pittsburgh has attempted to identify and list new words in the various mathematical processes. She has been especially concerned with commonly known words which have different meanings in a mathematics context. For example, the word "function" may mean "the junior prom" to some pupils, a far cry from the mathematical concept.

Applications of mathematics.—A group [12] of junior high school teachers recommended for their success in teaching rapid mathematics learners indicated that they emphasized the social uses of mathematics most frequently to motivate mathematics study. Usually the social uses of mathematics were emphasized through class discussions, reading of pamphlets on applications of mathematics and assignments of application problems prepared by leaders in mathematics education.[13] However, in addition to classroom activities, some mathematics teachers use field trips to enrich their instruction. The field trip, an educational experience requiring the pupil to leave the classroom,

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[11] *Teaching Rapid and Slow Learners in High Schools.* Washington: U. S. Government Printing Office, 1954. (Office of Education, Bulletin 1954, No. 5.)

[12] *Teaching Rapid and Slow Learners in High Schools.* Washington: U. S. Government Printing Office, 1954. (Office of Education, Bulletin 1954, No. 5.)

[13] National Council of Teachers of Mathematics. *Seventeenth Yearbook, A Source Book of Mathematical Applications.* New York: Bureau of Publications, Teachers College, Columbia University, 1942. 291 p.

Falker, C. A., Schweinhagen, E. A., and Paine, H. W. *Aviation Mathematics,* Milwaukee, Bruce Publishing Co., 1944. 356 p.

permits the teacher to point out the relationship between classroom mathematics and mathematics in the community. A study [14] indicates that although field trips are not a regular part of most mathematics courses, they are used three times more frequently in the junior high school than in the combined junior-senior high school; and are used more frequently in seventh and eighth grades mathematics classes than in ninth grade classes. Some schools have found that the field trips are quite helpful in enrichment and motivation. For example, superior pupils in the Santa Barbara La Cumbre Junior High School made frequent trips to community industries and social institutions to see how mathematics is applied there.

The superior pupils of a Tennessee school, after studying the principles of ratio and proportion, went out to a tannery, where they observed these principles being applied in mixing solutions. Another group studying a unit on informal geometry observed geometric designs in a visit to a button factory. Some schools have encouraged superior pupils to visit banks, city government agencies, and retail stores to see how mathematics is being used.

The public schools of Indianapolis, Ind., publish a catalog of information about places which children may visit and what they will see, and complete details as to arrangements and transportation.[15] A more general bulletin is issued for the guidance of junior high school staffs in New York City.[16]

The value of the pupil's seeing the importance of mathematics as a tool and as a way of thinking cannot be overemphasized. However, some teachers feel the superior pupil may gain this understanding more rapidly and on a broader basis by vicarious procedures. For example, the reading of a short article by a superior student about the uses of mathematics in several industries may be more beneficial to him than a visit to a factory. In many cases the applications of mathematics in industry are beyond the experience of even the superior junior high school pupil. A visit to a local store may be an inefficient way to show the uses of mathematics, and it may emphasize the use of mathematics as a tool rather than as a method of thinking or as a precise way of expressing quantitative relationships.

Pupils as teaching assistants.—A frequently used method of enriching educational experiences for the superior pupil is to permit him to tutor other pupils in the classroom. Teachers who were reported to be successful with rapid learners in mathematics ranked this plan as sixth among thirty procedures. If the technique is used in moder-

[14] Brown, Kenneth E. *Mathematics in Public High Schools.* Washington: U. S. Government Printing Office, 1953. (Office of Education, Bulletin 1953, No. 5.)

[15] Curriculum and Supervision Service Division. *A Handbook on Community Resources.* Indianapolis, Ind., Public Schools, 1953.

[16] Curriculum and Supervision Service Division. *Bridges Between the School and the Community.* New York City: Board of Education, 1949.

ation, however, it may enrich the pupil's experiences. On the other hand, if the tutoring is confined to a single process with which the pupil is quite familiar, it may soon degenerate into a mere mechanical repetition. Occasionally teachers permit superior pupils to teach an entire class. This seems to stimulate the better pupils, and is an excellent method of attracting these pupils to teaching as a career.

A science teacher in the Lincoln Junior High School in Kenosha, Wis., allows superior pupils with an adequate background to teach topics like electronics and radio. For this technique to be successful, the class activities, lesson presentation, and evaluation of the past progress must be carefully and cooperatively planned by pupil and teacher. The time involved, however, prevents many teachers from using this procedure.

Many superior pupils assist in mathematics or science laboratories. A few schools make such laboratories available to the pupils during the entire school day. Using pupils as assistants in these laboratories relieves the teachers of routine duties and provides an excellent opportunity for the pupil to develop on his initiative. Teachers should realize, however, that if the same pupils serve many times as tutors or laboratory assistants, they soon lose status with their peers. When pupil assistants are used in any teaching situation, careful planning is required if all concerned are to derive maximum benefit.

Teacher-pupil planning.—Organizing and planning for the enrichment of the superior pupil varies from teacher to teacher. Some teachers give only general encouragement if the pupil prepares a special report or solves a difficult problem and gives him little recognition for his extra work. Other teachers plan, with the pupil, his extra projects, book reports, and additional problems. If the reports are written, they may be reviewed by the English teacher; if they are oral, the speech teacher may be included on the evaluation team. The teacher-pupil planning and committee work in science classes observed in Mosholu Parkway Junior High School (No. 80) in New York City is an example of this type of cooperation.

Sub-Grouping Within a Class

In some schools it is not possible to group pupils in separate classes according to their previous academic achievement. Especially in small schools the enrollment in one subject will not be enough for two sections. Hence, individual differences in the class will be quite great. To provide for the few superior pupils in the class, some teachers will encourage these pupils to work in a subgroup within the class. In order to prevent permanent segregation of the group and the develop-

ment of an unhealthy educational climate, the whole class will work together frequently.

For example, for the topic "our number system," in one class all the pupils took part in planning class outcomes and activities during the unit. However, on most of the unit the class worked as small subgroups. Although the groups were flexible, the superior pupils were inclined to work together. In a few days the entire class evaluated their progress. Some of the pupils were able to explain the importance of place value in multiplication, while a few superior students who had compiled a multiplication table using a base other than 10 explained it to the class.

It is not feasible and may not be desirable to keep a class together on a particular topic for a long period. Superior pupils working in small groups will have information and an understanding of concepts far beyond that of the average child in the class. However, from time to time the superior pupil should report back to the entire class. His report should be a contribution to the common problem being studied. Teachers who provide for the superior pupil through subgrouping seem to follow these guide lines:

(1) The teacher plans with the entire class what they are going to do and what they expect to accomplish.

(2) The units are short; therefore, the superior pupils are never working as a segregated group for more than a few days at a time.

(3) The sub-groups are not always composed of the same pupils.

(4) The superior group makes a contribution to the general objective of the class. For example, if the topic is the metric system of measurement, the superior subgroup contributes information on this topic. For the morale of the class it is important that all pupils understand that the entire class is studying toward the same goals.

(5) The entire class evaluates the projects. Together they try to answer the question, "Has the study of the unit accomplished what we expected?"

Experienced teachers often warn the neophyte teacher that it is very difficult to get more than 1 or 2 subgroups to work constructively under their own initiative. Perhaps the teacher should begin by forming only one small subgroup. Some of the Seattle mathematics teachers have suggested that this is a desirable procedure. Several of the experienced teachers there have three or more subgroups actively studying on different projects. Although a minimum of classroom supervision seems to be the case, actually the procedure requires considerable teacher-pupil planning.

At Waukegan Road School in Northbrook, Ill., seven eighth-grade boys, designated as an honor group because of superiority in mathe-

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matics, spent most of their time working in a room apart from the class. Their activities were characterized by much discussion. Test results showed that their achievement improved. At Pasteur Junior High School in Los Angeles, Calif., about 40 of the very able arithmetic pupils, scheduled for cashier mathematics, handled the finances of the school lunch program as part of the class activities.

Individualized Instruction

Many teachers provide individual supervision and guidance during the class period for the superior pupil. Out of 30 procedures for the rapid learner used by a selected group [17] of junior high school teachers of mathematics this procedure was ranked fourth.

The administration in some schools encourages teachers to use individualized instruction. It may be used for all subjects of a particular grade, as in the seventh and eighth grades of a Minnesota city, or it may be used for only one subject of a grade as in a certain Tennessee city. The procedure may be used for an entire class or for only a section group. The upper (and lower) 10 percent of the pupils enrolled in mathematics may be segregated into smaller classes and given individual instruction. In Hughes Junior High School, Long Beach, Calif., both the rapid learners and the slow learners were placed in small classes where more individual instruction was possible than in classes with large enrollments. Some courses in mathematics in Polytechnic High School in Los Angeles, Calif., were conducted on an individual basis by means of job sheets. This permits the pupil to work at a rapid rate and discourages the talented from dropping down to the pace of the slow learner.

A boy with high intelligence at La Cumbre Junior High School in Santa Barbara, Calif., was given free reign, and he spent his time primarily in studying astronomy. Provisions for individual progress in the mastery of grammar and mathematics were found in the work sheets kept in open files of the classroom in University School, Columbus, Ohio, and in individual progress records. At Skokie Junior High School in Winnetka, Ill., some teachers in geometry encouraged the superior pupil to keep an individual notebook for developing theorems and solving problems that were considerably beyond the experiences of the rest of the class. Other geometry teachers helped the superior pupil develop a notebook on non-Euclidian geometry with emphasis on understanding the foundations of geometry rather than accumulating exercises in non-Euclidian geometry.

Some schools that do not offer a particular course in mathematics will encourage the pupil to take that course by correspondence. He

[17] *Teaching Rapid and Slow Learners in High Schools.* Washington: U. S. Government Printing Office, 1954. (Office of Education, Bulletin 1954, No. 5.)

will study in a small mathematics class or a study hall supervised by a mathematics teacher. The mathematics or study hall teacher will assist the pupil from time to time. In this way the pupil can gain needed information with minimum assistance from the teacher, even though the course is not offered in the school.

The University of California at Berkeley, Calif., offers a complete list of high school courses for extension study.[18] Any pupil who wishes to take a course not offered in his school may receive this correspondence instruction. Local schools give credit for courses successfully completed.

Methods of individual instruction—Oral reports, special problems, projects, tutoring, or correspondence study—can be used in a small junior high school. Mathematics teachers using methods of individual instruction state that (a) small classes are essential to their success, (b) the units of instruction should be self-teaching, (c) the testing program should be self-administered, (d) adequate supplemental material at several grade levels is needed, and (e) there is danger of emphasis on mathematics skills without an understanding of the process involved. Even though individual instruction as a general procedure may not be economically feasible or educationally sound, undoubtedly all mathematics teachers have some occasion to use individual instruction with some pupils.

Supplementary Material

For methods of enrichment and individualized instruction to be successful, appropriate supplementary material on many grade levels is necessary. The supplementary material should include a variety of textbooks, workbooks, standardized tests, films, filmstrips, models, construction material, magazines, pamphlets, and an adequate laboratory for constructing models and performing experiments to be mathematically interpreted.

Supplementary textbooks.—When a pupil does not understand a textbook explanation or the teacher's oral explanation, some teachers will give him a textbook that uses a different approach to the concept or states it in a simpler vocabulary. For example, in an algebra class composed of superior pupils, one boy did not understand the meaning of signed numbers. Instead of repeating the same explanation or asking him to read his text again, the teacher gave him two junior high school books that contained explanations in very elementary terms. After reading these explanations, he was able to read his own textbook with some understanding. *The boy was learning not to depend upon the oral explanation of his teacher but to get*

[18] University Extension, "High School Catalogue, Supervised Study by Correspondence, 1954," *Lifelong Learning*, XXIII, No. 21 (November 23, 1953).

information from the printed page. As soon as a student has this ability the teacher is relieved from the task of interpreting the textbook's printed instructions and may guide the pupil to appropriate sources of additional printed information.

In the foregoing example it is true that, by the time the pupil understood the elementary explanation of signed numbers, the class period had expired. He had not solved the assigned twenty addition and subtraction problems of signed numbers. The teacher believed that solving the twenty exercises without understanding them not only would have benefited the pupil very little but also would have been a detriment to him. His concept of algebra would have been a maze of symbols and he would have failed to see the applications of algebra to life. He would have been unable to apply the most elementary concepts to the solution of problems. The pupil would soon have forgotten the non-sense operations. When he encountered written or verbal problems involving algebraic operations for their solution, he would have had no idea of what to do. The teacher would then have had to reteach signed numbers to a boy whose mind was set against them.

Sometimes when encountering a wide range in pupil abilities, teachers assign the superior pupil material from textbooks more advanced and difficult than those used by the average pupil. The Lafayette Junior High School, Los Angeles, and some of the San Diego junior high schools use workbook sheets as supplementary material. These workbook sheets are selected to meet the individual pupil needs.

At the Roosevelt Junior High School in Sacramento a list of special problems has been compiled. The pupil and the teacher together selected problems to enrich the pupil's science background and to motivate him to further study in the area.

Since the range of reading level is so great in most classes, classroom teachers have found it necessary to have on hand materials to suit all levels of ability. For the advanced reader, this often means books and magazines written for senior high school pupils or adults.

A teacher of science at the Roosevelt Junior High School, Sacramento, Calif., has prepared a list of suggested topics, projects, and problems for the superior pupil. The instructor in a science class at Jefferson Junior High School, Long Beach, Calif., prepared a guide to each unit. This guide includes references and study plans, that is; things the pupils are to learn and do, notebook material and drawings, a vocabulary list, and in some cases methods of evaluating progress.

At the Polytechnic High School, Los Angeles, job sheets are provided for each pupil in some of the mathematics courses. After he

completes the material outlined in the job sheet, he must make a satisfactory score on a test before proceeding with the next job sheet. If he fails the test, he is given a second job sheet similar to the one he has just completed.

Many teaching guides developed by local schools contain supplementary problems and suggestions for enriching instruction. The appendix of *Curriculum Materials in High-School Mathematics*, Bulletin 1954, No. 9, Office of Education, United States Department of Health, Education, and Welfare, contains an annotated list of currently used teaching guides, several of which have suggestions for enriching the mathematics program. For example, the public schools at San Francisco and Santa Barbara, Calif., and Tulsa, Okla., have developed supplementary instruction material and teaching aids for their local use.

Aids laboratory.—Some city school systems have centrally located libraries where teachers may secure extra textbooks, enrichment books in mathematics and science, and models to clarify the presentation of difficult topics. After a few days the material may be returned to become available to other teachers. The Portland, Oreg., public schools maintain in the central office an excellent assortment of models available to the teachers.

Models are helpful to all pupils. In mathematics study, however, the student should think about abstract terms as soon as possible without the aids of crutches or models. Nevertheless, in the initial study of elementary concepts at the junior high school level, many superior students will gain a new depth of insight through the use of visual aids and the construction of models.

Free and inexpensive aids.—Many teachers with little experience have developed considerable material for the library corner by selecting free and inexpensive pamphlets from such lists as: *Chicago Schools Journal Supplement*, from Chicago Teachers College, 6800 Stewart Avenue, Chicago 21, Ill.; and *Free and Inexpensive Aids for the Teaching of Mathematics*, (Circular No. 348, Rev.); *Teaching Materials for Mathematics Classes*, (Circular No. 399) both from Publications Inquiry Unit, Office of Education, United States Department of Health, Education, and Welfare, Washington 25, D. C. THE MATHEMATICS TEACHER frequently contains descriptions of new instruction aids and reviews of supplementary reading material.

Industry has developed small pamphlets useful in enriching the program of the superior pupil. Examples are *Mathematics at General Electric* by General Electric Co., Schenectady, N. Y.; *Optics and Wheels* by General Motors, Detroit, Mich.; *How Long is a Rod?* by Ford Motor Co., Dearborn, Mich. Getting suitable current material to keep up to date on such topics as atomic power and appli-

cations of mathematics to industry is an ever-present problem for science and mathematics teachers. However, from time to time new pamphlets do appear from leading industrial and research organizations. Often these materials are written especially for junior high school pupils in very elementary language with the attractive illustrations; for example, *Atomic Power* by General Electric Co.

To help the pupil understand the importance of mathematics, teachers frequently have available in the classroom such bulletins as *Why Study Math?* by General Electric Co.; *Professional Opportunities in Mathematics* by the Mathematical Association of America, University of Buffalo, Buffalo 14, New York; *Your Opportunities in Science and Engineering* by the National Association of Manufacturers, 14 West 49th Street, New York 20, N. Y.; and *The Guidance Pamphlet in Mathematics*, National Council of Teachers of Mathematics, 1201 16th Street, NW., Washington 6, D. C.

By using free and inexpensive material such as the publications mentioned above, the superior pupil may explore and develop projects that will broaden his concepts in mathematics. These aids will help the pupil prepare mathematical models and reports of the applications of mathematical concepts to business and industry with very little assistance from the teacher.

Audio-visual aids.—The filmstrip is a good enrichment device for an individual pupil or a small group, for it can be used by superior pupils in a corner of a classroom without interrupting general activities. An opaque projector can be used to show printed material and also mathematical solutions, diagrams, and graphs made by superior pupils. Film slides can be made by superior pupils and retained in the school library. Pupils at Halsey Junior High School (No. 157) in Forest Hills, N. Y., tape record especially good class programs and then file the tapes for other classes to use. Some schools use television broadcasts planned to coincide with class lessons.

Schools in several places are fortunate enough to have their own radio and public address systems, which afford many ways of enrichment. Portland, Oreg., public schools have their own radio station, and an example of how this gives children an outlet for talents requisite for radio work is the project of a ninth grade class at Lincoln High School, which prepared a panel-type program to show some of the developments in their classroom studies.

Providing for diverse activities in a classroom can be facilitated by such equipment as a typewriter, a classroom library, tables, workbenches, and movable chairs. Display cases, bulletin boards, and storage space are important, too.

Out-of-Class Activities

Providing for individual differences through out-of-class activities is common practice throughout the country. Here the child can explore areas of human activity not emphasized in his classroom and at the same time develop his particular abilities and interests. These out-of-class activites, which enrich and motivate his learning, are planned and take place outside of the regular class period. Although not usually contributing directly to the goals of a particular class, the project is under the supervision of the school faculty. Examples of such activities are mathematics clubs, mathematics contests, and county exhibits of mathematical projects and models.

Mathematics Clubs

The mathematics club is one of several frequently suggested out-of-class activities for the superior pupil. Such clubs, however, are not being used as frequently as their potential value would indicate that they should be. In a randomly selected sample [19] of 782 public secondary schools only 55, or 7 percent, of the schools had mathematics clubs. In one-third of the schools the clubs were held after the regular school day. This schedule may have been a factor contributing to the small enrollments of some clubs. One-half of the clubs averaged fewer than 20 members. In fact, one-fourth of the clubs had enrollments of 10 or fewer. Usually they had either small memberships or large ones. Only 3 clubs reported a membership of 31 to 40 persons. Some clubs (18 percent) had 40 or more pupils. The largest reported contained 150 pupils. In general, the number of meetings per month of the clubs fell into three categories: Forty percent met once each week; 28 percent, every other week; and 28 percent met only once a month. The length of the mathematics club period ranged from 20 to 60 minutes. About one-third of the club periods lasted 31 to 45 minutes.

If the sample is representative of the secondary schools in the United States, there are 1,700 mathematics clubs in the United States enrolling approximately 35,000 pupils.

Contests

Contests in mathematics and science have been used successfully in motivating the superior pupil to study more intensively in these fields. The Science Talent Search sponsored by the Westinghouse Educational Foundation stimulates the capable pupil to study rather intensively a particular topic and present his findings in a scientific manner. In

[19] These data are from a survey made by the Office of Education, U. S. Department of Health, Education, and Welfare, in 1953.

some communities local clubs of engineers and scientists assist teachers in guiding the superior pupil. The adult engineers' club of one community prepared a list of topics suitable for the Science Talent Search contest. Their list included the names of engineers who were willing to advise and assist pupils on various topics. This personal contact with adults in special fields not only provided needed occupational information but also motivated the superior pupil to develop his own potential talent.

The Wilson Junior College of Chicago has sponsored for several years a mathematics tournament providing awards to schools as well as pupils. The University of Chicago, the New York section of the Mathematical Association of America, Pi Mu Epsilon of New York University, Los Angeles City College, Interscholastic League of New York City, the American Chemical Society, Future Scientists of America Foundation, and the William Lowell Putnam Foundation have all conducted contests and given awards for superior pupils in mathematics and science.

Scholarships

Scholarships for mathematics study on the college level encourage superior high school pupils to take advanced courses in high school mathematics. A compilation of scholarships and fellowships for 1949–50 showed that in 1,198 institutions of higher learning 124,223 scholarships were awarded, valued at approximately $27 million. Many of these were scholarships for general academic study but some were confined to mathematics study. The scholarships for undergraduate college mathematics ranged from $13.75 to $550. In some cases the colleges provided several mathematics scholarships with only a small stipend. For example, Guilford College, N. C., and Drury College, Mo., had 18 and 22 respectively; and each one was for $100. In Louisiana, scholarship examinations are sponsored by the State Department of Education and several colleges. Examinations are given in each district and at least one scholarship is allotted for each district in addition to several for the State at large.

Colleges, industries, and labor organizations are promoting scholarships for capable pupils. A report, "Sponsored Scholarships," by Charles C. Cole, Jr., which may be obtained from College Entrance Examination Board, 425 West 117th St., New York City, listed 452 scholarship programs sponsored by 442 organizations. The number of scholarships was 9,000 with an annual value of $5½ to $5½ million. The scholarships varied in number, size, and scope and also showed an equally great diversity in eligibility requirements for participants. Some scholarships were available only to an applicant of a specified sex, a resident of a certain locality, or a student in a particular college

and special curriculum; or to one whose parents were employees of the designated organization and who had a particular religious affiliation. Sixty-five percent of the scholarships required that the recipient possess a certain level of academic ability.

For example, the Milwaukee-Downer College scholarship requires the pupil to be in the upper quarter of his high school graduating class and to pass a competitive examination. The Armour Research Foundation scholarships require that the pupil be in the upper 25 percent of his graduating class. In many cases the eligibility requirements, unrelated to the student's potential success and limiting the number of applicants, result in some available scholarships not being awarded.

Although industries and foundations are sponsoring many scholarships today, the amounts of some of them are so small that they are of little practical value. In other cases the awards are confined to one college. For example, the Bausch & Lomb Co. has a scholarship which is available only at the University of Rochester. All of these scholarships are of great value in stimulating the superior pupil to greater achievement. Greater maximum value might accrue, however, if they were not confined to small regions or specific colleges, but were available to all pupils everywhere with academic potential.

Fairs and Conferences

Some teachers are actively promoting science and mathematics fairs which encourage and motivate superior pupils. For example, the annual science fair in the public secondary schools of Washington, D. C., is a motivating factor for more intense study of science and mathematics. A recent fair included exhibits of pupil projects in geometric construction, cycloids, linkages, and a mechanical device for solving quadratic equations.

Outstanding fairs include the science awards exhibit at Cincinnati, Ohio, the science exposition at Portland, Oreg., the science fair at Hyattsville, Md., and the school science fair at Pittsburgh, Pa. These fairs recognize outstanding individual and group work in both mathematics and science. Independent research is encouraged.

An all-day mathematics assembly is held every year at Purdue University. One feature is a display of mathematics projects, made by high-school pupils, similar to displays at science and mathematics fairs. Many high school pupils attempt to develop outstanding mathematics projects in order to qualify to attend the assembly.

Professional organizations are contributing to the improvement of instruction for the superior pupil. For example, at regional and national meetings of the professional organization of mathematics teachers, exhibits are set up of projects by high school pupils. Many

high school pupils in the locality of the meeting not only contribute to these exhibits but also attend them.

Some local sections of national professional societies seek out mathematics teachers and superior pupils in the area schools and encourage them to visit the groups' technical and social meetings. Local professional clubs often encourage the maintenance of science and mathematics clubs.

Many teachers help pupils in worthwhile out-of-class activities. For most teachers this means extra hours after school.[21] In general, junior high school teachers have no free time in school even to prepare for general class activities. Teachers should be given time to guide pupils in valuable out-of-class scientific and mathematical activities. This type of instruction for our superior pupils might require additional funds, but it would undoubtedly pay large dividends in increased numbers of scientific personnel. We spend much out-of-school time for athletics, buy expensive equipment, and provide extra pay for good coaches of our athletically talented. Should we not make similar provisions for those who are talented in other areas?

Organizational Provisions for the Superior Pupil

Many procedures are used in developing a superior pupil to his maximum capacity. Some are largely organizational and under the control of the school principal, while others are almost entirely the responsibility of the classroom teacher. In either case a successful program requires the administration's understanding support and the faculty's intelligent cooperation. The pupil should learn, and the teacher should be aided, more effectively as a result of all new organization procedures. If these results are not achieved, the procedures should be altered or abandoned. Since teachers and their goals differ as pupils differ, many methods successful in one community may be unsuccessful in another. The methods described here are examples to provoke study rather than model techniques to be adopted.

One of the most troublesome issues faced by any junior high school staff which seeks to provide adequate training for the superior pupil is the question of grouping. The choices range from segregated schools, through all the possible variations of partial segregation and special groupings, to complete adherence to the principle of heterogeneity in the school organization.[22] No other controversial issue in

[21] Brandwein, Paul F. *The Gifted Student as Future Scientist.* New York: Harcourt, Brace & Co., 1955, pp. 77–78.

[22] Parker, J. Cecil, and Russell, David H. Ways of Providing for Individual Differences. *Educational Leadership*, 11: 169–174. December 1953.

the education of the superior pupil has such a wide divergence in examples of policy being translated into ongoing programs. Probably no agreement will ever be reached as to the "best" way.

The problem of awarding marks to pupils is an example of the kind of difficulty which arises when schools begin to experiment with grouping. A valid objection often raised by children in segregated classes for the gifted is that they are penalized by being judged for marks on the basis of their relative standing in the top ability group rather than on the basis of their standing with respect to all children at their grade level in the school. A "C" in a highly selective, top-ability group might have been an "A" or a "B" for the same quality work in a heterogeneous class. College students who participated in the discussions of the section on gifted children at the Governor's Conference on Children and Youth at Sacramento, Calif., on February 25 and 26, 1954, pointed out that many colleges look for marks only and do not ask in what kind of a class a "C" was earned. They also protested against the injustice of such marking when scholarships are granted on the basis of school marks. This does not necessarily constitute an insurmountable difficulty, but it is one [28] of the many issues which must be resolved by junior high school facilities if they are planning to set up classes based upon ability grouping.

Special Schools

A separate school for the superior pupil is used in some communities to provide educational experiences to fill the particular needs of the talented. In these schools the purpose is to challenge the superior pupil by arranging for him to work with other pupils of similar ability.

Separate public high schools for superior children at the junior high school level are not numerous, and usually they are schools that have been in existence for many years. The curriculum is essentially college preparatory in nature, and pupils who fail to maintain the high scholastic standards maintained by the school are transferred to a comprehensive school.

The oldest school of this type in the United States is the Boston Latin School, a 6-year junior-senior high school, founded in 1635. Boys who make high grades in elementary school may apply for admission. Their parents must certify that they intend to send their sons to college. Standards of academic achievement are kept high, and a spirit of competition is encouraged. Over 10 percent of the boys who enter the school drop out because of low academic marks.

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[28] Monroe, Walter S. (Editor) *Encyclopedia of Educational Research*. New York: The Macmillan Co., 1950, pp. 376-378.
Koos, Leonard V. *Junior High School Trends*. New York: Harper & Bros., 1955, pp. 122-124.

Another junior-senior high school for superior pupils is the Walnut Hills High School in Cincinnati, Ohio, which is a coeducational 6-year junior-senior high school, founded in 1895. This also is a strictly preparatory type of school, requiring Latin in the seventh and eighth grades, but no science. Admission to Walnut Hills is on the basis of high scholastic achievement in the elementary school, high standing on a scholastic aptitude test given to sixth graders, and parental approval. About one-third of the children who are eligible go to Walnut Hills. Since the academic mortality rate of the school is high, the faculty is studying the problem of admission requirements, with the hope of screening out potential failures more effectively in the future. The principal stated that one advantage of segregation on an intellectual basis was the complete lack of any derogatory attitude toward "brains." Walnut Hills is consciously patterned after the school life of private preparatory schools, with fraternities and sororities encouraged by the staff.

The Robert E. Lee Junior High School in Baltimore, Md., is a centrally located school devoted to the needs of superior pupils. Eligible children come to this school from all sections of the city. Lee Junior High School opened in 1905 as a "preparatory school," and the course of study is still essentially college preparatory in nature.

Special Classes

When there are enough children of high ability and similar interests in one area of curriculum within a junior high school, a special class for these pupils may be organized. Where special classes are organized for particular subjects, such as mathematics or science, the pupils in the special classes are usually scattered throughout the other subject classes to assure that the student body retains democratic heterogeneity. The term "partial segregation" is often used to describe a plan that puts superior children into special classes for part of their schedule. The purpose of the special classes may be for acceleration or enrichment or for both acceleration and enrichment.

For Acceleration.—An easily identified trait of the mentally superior pupil is his ability to learn rapidly from books. This trait has led many educators to accept the principle of acceleration in planning for these children. Variations in the philosophy of individual schools or city systems have led to a wide range of practices in providing acceleration for the superior pupil.

For many years a few cities have provided an opportunity for selected children to enroll in a speeded-up junior high school course which allows them to take the regular 3-year program in two years. Most of these schools have been in operation a long time. A few are

sustained by the enthusiasm of the alumni who want this kind of acceleration for their children.

Acceleration can be found in the special progress classes organized in selected schools in all sections of New York City.[24] Most of the children enrolled in these classes expect to attend college and professional schools. The requirements for admission to the seventh grade are: I. Q. of 130, reading level of 8.5 grade and mathematics level of 8.0 grade, minimum chronological age of 11 years, social maturity at least on a level with the average 12 year old, good physical health, elementary principal's recommendation, and parental approval. Percentages of eligible children who enroll in the special progress classes vary greatly from school to school. Principals select the teachers for these classes from the faculty of their schools, and any special training is in the form of inservice education. Since the children follow an accelerated program, their schedules tend to keep them apart from the other pupils in the school, except for participation in physical education classes and extraclass activities.

In some schools pupils are accelerated in certain subjects, but the time spent in the junior high school is not reduced. A junior high school may provide a program that permits pupils to complete seventh and eighth grade arithmetic in one year. The time gained is spent on another mathematics course or on some other subject, but the time required for graduation from the junior high school is not lessened.

An example of this type of segregation is found in La Cumbre Junior High School at Santa Barbara. The rapid learners in algebra spend three days each week on the material that is studied five days by the other pupils. The two days thus gained are used for enrichment activities through a seminar-type program which includes field trips to industries where mathematics is being used. The topics for study are derived from group discussions, and the record of a year's activities shows a rich and varied array. Some of the projects in 1953–54 were: development of the ability to conduct independent study, a trip to a television studio, studying vocations, visiting a weather station, seeking understanding on national and international problems, measurement of time and its significance, and poetry reading and appreciation.

Another example is the special arithmetic program begun in 1951 at the Lindbergh Junior High School, Long Beach, Calif. Pupils who make high scores on the fifth grade arithmetic survey test and who are recommended by their sixth grade teacher are assigned to an accelerated seventh grade program. During the seventh year they study substantially the material usually found in seventh and eighth grade

[24] Jansen, William, *Our Public Schools, Part I: Gifted Children and Slow Learners in the Junior High School* New York: Board of Education, 1952. p. 3-11.

arithmetic textbooks. Upon completing the seventh grade, pupils who have superior ratings on a standardized eighth grade arithmetic test are excused from arithmetic during the first semester of the eighth grade. During the second semester of eighth grade these superior pupils are enrolled in an arithmetic program based upon material taken from the ninth grade course in consumer mathematics. Those pupils excused from the first semester of eighth grade arithmetic are permitted to elect another course such as typing. In some schools the time saved through accelerated classes is devoted to a study of more mathematics rather than other subjects.

In the Gove Junior High School, Denver, Colo., superior pupils complete the normal seventh and eighth grade arithmetic program plus the ninth grade general mathematics course in 2 years. Pupils in these accelerated classes are selected on the basis of mathematics expectancy. Data to determine mathematical expectancy are secured from scores on achievement tests, interest tests, abstract reasoning tests, and the cumulative record folder giving teachers' marks and recommendations.

In one of the special classes in arithmetic at the Gove Junior High School, the growth in 1.4 years was 4.5 grade points. The ceiling for the reasoning test was 13 years, and more than one-half the pupils of the special seventh grade group reached it. The test results indicate what happens when superior pupils are challenged.

Superior mathematics pupils at the Smiley Junior High School in Denver, Colo., are kept together with the same teacher for three years and they usually finish algebra III by the end of the ninth grade. At Jefferson Junior High School in Long Beach, Calif., the highest ability class finishes the regular eighth-grade mathematics work in the first semester and then has a semester of consumer mathematics, using the textbook from the ninth grade general consumer mathematics course. Consumer mathematics is a course given to those who do not take algebra at Jefferson. High ability pupils ordinarily do not get this work. At Scarsdale, N. Y., children for whom eighth grade arithmetic is too easy are given algebra.

The acceleration in one subject makes scheduling of pupils a complex problem, but the benefits to the children outweigh any inconvenience to administrators. One of the biggest stumbling blocks to such acceleration is the matter of articulation with higher schools. (This is the same sort of difficulty facing senior high schools that are giving pupils work which entitles them to advanced standing in college.) There is an apparent need for an agreement of junior and senior high school mathematics teachers on this issue. To avoid any such conflict, the La Cumbre Junior High School at Santa Barbara, Calif., limits the fast learners in algebra to three days a week for work

in this subject, while the average class spends five days a week on the same material. This keeps all students at the same level of mathematics, but the question immediately arises as to why the superior should not be allowed to go on into more advanced mathematics.

For Enrichment.—Although enrichment takes place in the special classes just described, their primary purpose is to enable pupils to complete the course requirements in less than the normal time. The time gained is spent in further study of mathematics or some other subject. There are other special classes for the pupil in mathematics which enrich the pupil's experience and do not lessen the time spent in school or on the subject. In many cases the content of the mathematical opportunities in these special classes is quite different from that given the slow pupil. The special classes for the superior pupil emphasize abstract and sequential mathematics and the classes for the slower pupil stress consumer mathematics. These separate programs based on different pupil needs have led to the terms "two-track" program, "three-track" program, and "alternate courses" plan.

Perhaps the most frequent type of special class for superior pupils is found in the "alternate courses" or the "multitrack" plan. Under this plan a pupil in the ninth grade may enroll in algebra or general mathematics depending to a large extent on his ability. In a recent survey [25] of a sample of randomly selected junior high schools 65 percent of them offered a "multitrack" plan. Approximately 50 percent of the junior high schools in the survey offered the combination, algebra and general mathematics. A few of the schools increased the number of alternate courses to provide a four-track program.

The Polytechnic High School, Los Angeles, offered a three-track program with industrial mathematics as the third track. In most schools that offer a three-track program the alternate courses are algebra, general mathematics, and arithmetic. Some schools offer a three-track program which consists of arithmetic, general mathematics, and an advanced or more difficult general mathematics. For example, San Diego public secondary schools offer courses A, B (mostly arithmetic); mathematics 100–200 (arithmetic, informal geometry, consumer mathematics, and introduction to algebra); and mathematics 300–400 (similar to mathematics 100–200 with less time given to arithmetic.) Of the ninth-grade pupils enrolled in mathematics, 10 to 20 percent are enrolled in mathematics A, B and about the same percentage in mathematics 300–400 and the remainder of the pupils are in mathematics 100–200.

Some schools have a special class for superior pupils in their summer session. For example, Inglewood, Calif., has a summer program for

[25] Brown, Kenneth E. *Mathematics in Public High Schools.* Washington: U. S. Government Printing Office, 1962. (Office of Education, Bulletin 1962, No. 5.)

superior seventh and eighth graders. The minimum I..Q. for participation is 130. Regular teachers direct the summer program, in which each child plans and develops a special project of his own choosing. This is offered in addition to a regular summer school program for all children.

Among other schools which are conscious of the problem of providing for the superior junior high school pupil and which have some experimentation going forward in their classrooms are the following: Lakewood Junior High School in Long Beach, Calif.; La Jolla Junior High School in San Diego, Calif.; and the Nichols School in Evanston, Ill. At Nichols, a form has been developed for aiding seventh grade arithmetic teachers to classify their incoming pupils on the basis of elementary school records.[35]

A conference on the education of the gifted, held at Teachers College, Columbia University on December 13 and 14, 1940, emphasized that acceleration is probably one of the best answers in sequential subjects like mathematics and that, on the other hand, enrichment serves the needs of gifted children in content subjects like history and social science.[37] A study in California showed that class time in algebra could be reduced 15 percent without injury to the learning of superior students.[38]

Those who doubt that junior high school pupils have the ability to accelerate in mathematics should bear in mind that such acceleration has been going on for years in the group acceleration classes at Baltimore and New York.

Special classes for junior high school pupils talented in science are not nearly so frequent as special classes for those talented in mathematics. The prevailing pattern in schools with homogeneous grouping is to provide enrichment within the classes that are composed of superior pupils. Schools with heterogeneous classes attempt to provide individual enrichment for the talented wherever they are found.

Opponents of segregated schools and special classes for superior pupils protest against the undemocratic nature of such provisions. They point to the dangers of creating an "education for the elite" and of inculcating snobbishness in children. These opponents assert that intellectually gifted children need the experiences that come from working and planning with those who think less deeply and learn less rapidly, for they will have to associate with such people in family, social, vocational, and civic affairs throughout their lives.

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[35] See appendix E, p. 88.

[37] Briggs, Thomas H. (chairman). Some Issues and Problems Raised by the Conference on Education for the Gifted, Seminar V, Education of Gifted Pupils in Secondary Schools. *Teachers College Record*, vol. 42: 442-451, February 1941.

[38] Albers, Mary Elizabeth, and Sanger, May V. Enrichment for Superior Students in Algebra Classes. *Journal of Educational Research*, 40: 481, 486, March 1947.

On the other hand, advocates of schools and special classes for superior pupils point out that it is democratic to provide the best possible learning conditions for *each* pupil and that for the superior pupil a separate school or class provides the best learning conditions. The advocates cite studies to show that the children do not become snobs but socially adjusted superior adults. They claim that since superior adults tend to associate with those of similar ability—birds of a feather flock together—the superior child should learn to plan and to work with those who are intellectually talented. As the controversy continues, many teachers say that the most desirable learning takes place somewhere between these two extremes; that is, the superior pupil should study certain problems and subjects with those of similar ability and interests and also should have other educational experiences with those who are not similarly talented.[28]

Individual Acceleration

Some junior high school administrators believe that for certain individual children a moderate amount of acceleration can be beneficial. In each case where such provisions are made, principals are careful to point out that they insist upon a study of the possible effects of acceleration upon the child's social development. At the junior high school age level, the physical maturity of the child is an important factor to be considered. A Hunter College study suggests that acceleration under proper conditions may be beneficial to the child.[29]

Sometimes individual acceleration can take place within the regular classroom. At the University School in Columbus, Ohio, an exceptionally able mathematics pupil was allowed to go ahead with a study of algebra while the rest of his class studied eighth grade arithmetic.

Successful adjustment, both academic and social, was evident when a boy with an I. Q. of 138 was given a special promotion in a junior high school in Utah. At the Lewis Junior High School in Boston, Massachusetts, irregular individual promotions are made to allow individual gifted children to advance at other times than the regular promotion date.

In planning for the gifted, teachers and principals in San Diego, California, and Modesto, California, recognize the possibility that the occasional superior child can benefit from special individual

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[28] Monroe, Walter S. (editor), *Encyclopedia of Educational Research*, New York: The Macmillan Co., 1950; p. 607-609. *Education of Exceptional Children*, Forty-ninth Yearbook, pt. II, National Society for the Study of Education: Chicago, University of Chicago Press, 1950, p. 209-230. Makovin, *Sister* Mary Vernice. The Gifted Child. *Special Education of the Exceptional Child*. Washington, D. C.: Catholic University of America Press, 1959: p. 49-59. Witty, Paul (editor) *The Gifted Child*, Boston, Mass.: D. C. Heath & Co., 1951: p. 215-229 and 231-251.

[29] Wilson, Frank T. The Evidence About Acceleration of Gifted Youth. *School and Society*, 73: 429-430, June 30, 1951.

acceleration. Baltimore, Maryland,[31] and Long Beach, California,[32] state the policy for acceleration of children at all levels in terms of the needs of individual children. (In Baltimore, the exception to this is the Lee Junior High School Program described above.)

Many junior high school teachers believe that mathematics is the one subject area where the best possible method of providing for the superior is acceleration. Schools which do not believe in group acceleration as such are discovering that enrichment, which may be suitable for the superior pupil in such fields as language arts, science, and social studies, many times does not provide adequately for pupil needs in mathematics.

Junior high school administrators generally recognize that a moderate amount of acceleration can be successful. However, they are quick to urge that it should be used with caution. The pupil accelerated should have (*a*) a superior achievement record, (*b*) a record of good health, (*c*) social and physical maturity, (*d*) advanced reading ability, and (*e*) the understanding cooperation of his parents. Although it may be important to shorten the training period for some superior pupils, too much acceleration can be very dangerous. Many educators feel that it is unwise to accelerate superior pupils more than one year during grades seven to twelve. Only a few believe that more than two years are good for selected superior pupils. If acceleration is accepted as one of the organizational procedures to assist superior pupils, the full cooperation of the pupil and the parents should be secured. Care should be taken to insure that the pupil does not receive undesirable publicity.

Identifying the Superior Pupil

Irrespective of organizational provisions or classroom methods employed to develop the superior child, he must be identified. Opinion varies widely as to all the factors that should be considered in identifying the superior junior high school child.

Tests

Standardized tests that attempt to measure several intellectual abilities are frequently used. Success in *quantitative reasoning* seems to be one of the desirable attributes of the talented pupil. *Verbal comprehension* is another significant factor in identifying superior pupils. Although some pupils with superior native ability

[31] Board of School Commissioners, *The Superior Child in the Baltimore Public Schools*, Baltimore, Md.: Baltimore Public Schools, 1953. p. 9, 22-23.

[32] Committee for the Very Superior Pupil. *The Very Superior Pupil, A Tentative Plan: Junior High School Edition*. Long Beach, Calif.: Long Beach Public Schools, 1952. p. 5-6.

may be poor readers, the pupil must be able to read to obtain academic success. *Abstract reasoning tests* or items in general tests which measure the ability to interpret relationships among diagrammatic materials may contribute additional information. *Interest tests* may reveal potential superior pupils. For example, in Denver, interest tests were one of the criteria used in successfully identifying superior pupils in eighth grade mathematics. Interest tests should be used with caution since some pupils may have a superficial interest in an area where in reality they lack ability to succeed. Also interest may be feigned, and it is rather unstable in junior high school youth. *Achievement test scores*, *school grades*, and other information from the student's cumulative record folder may be helpful in interpreting scores from interest tests. Although a single test on factual information may be very unreliable in the selection of superior pupils, standardized achievement tests can make a valuable contribution. The achievement test should be one that requires reasoning and application of general principles rather than merely recalling facts and formulas.

Informal Methods of Identification

In addition to standardized instruments for identifying the superior pupil, informal methods are used by many classroom teachers. The *teacher's opinion* is of value although it may be distorted by pupil friendliness, obedience, and attractiveness. A pupil's prompt completion of drill assignments may be mistaken for superiority. Creativeness may be submerged by conformity to inflexible regulations. Occasionally a pupil's special interests may even retard his achievement of the unchallenging goals set for the slow child. Although studies have shown that some teachers cannot identify the able pupil, it should not be assumed that a teacher's opinion and marks used in conjunction with other relevant data are not valuable. Teachers can improve and are improving their methods of identification. They are observing pupil characteristics that indicate potential in academic subjects.

A child's ability to solve difficult problems through *insight* rather than trial and error may indicate that he is superior. The child who organizes all the elements of a problem into patterns and *suddenly* emerges with a complete solution shows exceptional talent. The superior child will tend to arrive at a general solution even though a specific solution may satisfy the immediate need.

Creativeness is found among the talented. The superior pupil will not be satisfied with one solution to a problem. He will try to exhaust the possibilities and arrive at a general and significant solution.

This creativeness may be suppressed by authoritarian instruction or it may be nurtured in a democratic climate.

The superior pupil usually excels in *fluency of communication.* For example, his explanation of solutions and reports on assigned problems will tend to be clear, concise, and logical.

The able pupil will be recognized by *persistent intellectual curiosity.* He will readily recognize important problems and instead of turning to other pupils for a casual answer he will concentrate on the details until a general solution emerges. The superiority will often be reflected in a refined and polished solution.

An *extraordinary memory* may not be the reason for his superiority in mathematics, but few superior pupils are without amazing memories, especially for relationships. In solving problems they can recall pertinent data which they have encountered only occasionally.

Ability to *apply knowledge* to other situations is found in superior pupils. The pupil who applies a formula to a new situation and evaluates the result is exhibiting such an ability.

All these informal criteria—insight into the solution of problems, creativeness, fluency of communication, intellectual curiosity, extraordinary memory, and ability to apply knowledge to new situations—are being used by teachers to identify the superior pupil.

Cumulative Record Folder

In addition to data secured by informal methods all data from the pupil's cumulative record folder should be considered. The pupil's cumulative record folder may include I. Q. scores, achievement test scores, elementary school marks, a profile chart, anecdotal records of the pupil's behavior in class and out of class, the pupil's hobbies, and scores on tests in verbal comprehension, mechanical ability, abstract reasoning, space perception, and interests. A folder of this type is very helpful to the teacher in predicting the academic success of the pupil. Keeping a record of the predictions, and, after several years, checking the prediction with the pupil's achievement, also aid in improving the predictive techniques. The detailed reports from such a study would be especially helpful to future teachers.

Several school systems have devised evaluation forms for assembling the data on individual children. Excellent examples of such forms are those used in three California cities—Long Beach,[33] Modesto,[34] and Santa Barbara.[35]

Some school systems maintain files of case records of individual children. An outstanding system for keeping such records is used at

[33] See appendix A, p. 45.
[34] See appendix B, p. 47.
[35] See appendix C, p. 49.

San Diego, Calif., where the program for superior children is centered on providing for the individual pupil in his regular classes, without moving him to a special group. San Diego is one of the few cities which has seriously attacked the problem of locating superior children who ordinarily go unrecognized as such.

Difficulties in Identification

Owing to social maladjustment, emotional difficulties, or other causes, some children will always be found who are not interested in school activities. These children are not challenged by group tests any more than by most school situations, and those among them who are superior do not always get I. Q. ratings which truly reflect their mental abilities. Individual tests usually reveal the intelligence of these pupils more accurately than group tests. At San Diego, a number of children with low achievement in mathematics have been found with high scores on individual intelligence tests.

Delayed readiness is not confined to low ability pupils, either. A high honor student in a high school in Hollywood, Calif., did not learn to read until he was in the fourth grade. Now his hobbies include electronics, and he plans to be an engineer.

Another thing that can cause children to be misjudged is their apparent laziness or poor attitudes toward junior high school work. This might be the result of never having had any experience with a school program that challenged them. If this has been true for several years, a child can develop indifference, and even hostility, toward school.

Since social maturity does not always develop at the same rate as intellectual ability, this aspect of the superior child's development must be considered in any identification program, especially if he is to be placed in a special group. A Maturity Rating Scale has been devised at San Diego, Calif., to be used in connection with the identification program there.[36] A recent book gives a fairly complete account of the usefulness of a commercially available social maturity rating scale.[37]

Sociograms offer a simple way for classroom teachers to get a picture of group relationships, which can give much insight into problems of social maturity. Ruth Strang has used written composition assignments to obtain descriptions of inner conflicts of gifted adolescents.[38]

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[36] See appendix D, p. 82.

[37] Doll, Edgar A. *The Measurement of Social Competence*, Minneapolis, Minn.: Educational Test Bureau, Educational Publishers, Inc., 1953.

[38] Strang, Ruth. Inner World of Gifted Adolescents, *Exceptional Children*, 18: 97-101, 128. January 1952.

Identification Procedures Used by Many Schools

Intelligence tests, standardized achievement tests, informal tests, and teacher's observations all help indentify the superior pupil. The procedure used in the Long Beach public schools is typical of that used by many large school systems. The identification is based on the pupil's rank on an intelligence test and the score on an achievement test. Confidential data sheets containing these ratings and other pertinent information are sent to the teachers of the superior pupils. The teachers are asked to review these data and judge whether each pupil has been classified correctly or whether he would benefit by a change of program.

Responsibility for Identification

The school administration should decide where to place the function of identifying the superior pupil. If a school has a clearly defined program for making this identification, it is usually the responsibility of the director of the program. Otherwise, guidance personnel, supervisors of instruction, or curriculum directors may be asked to take care of this task. In small junior high schools, the principal often handles the matter himself. There is no demonstrably most logical person to whom identification should be assigned. Perhaps the important thing is that the assignment should be made to a capable and interested person. Because a school must know who its superior children are and what their needs are before it can plan intelligently for them, this function of identification must be provided for by the administrator.

Activity intended to meet the needs of superior children must not stop with the identification process and leave the rest to chance. One large city system developed an elaborate setup for locating gifted children but was forced to abandon it after several years. Teachers protested that although they spent much time in filling out forms they saw no results of their efforts; for no provision was made to improve the education of children identified as superior.

The majority of schools which identify their more capable children do so for the purpose of assigning them to classes on the top level in an organization based upon the principle of ability grouping.[29] Such grouping is usually for academic subjects only, although a few schools keep the divisions intact for all subjects. Most junior high schools which have ability grouping have found that they are able to distinguish about two or three levels and they build their programs on that basis. The East Junior High School at Nashville, Tennessee,

[29] Lanehner, A. H. Trends in Junior High School Practices. *The Education Digest*, 17: 31-33. February 1952.

however, divides its pupils into as many ability levels as there are homerooms, usually ten or eleven. The division is on the basis of reading ability, and the principal reports that the faculty has given the plan more support each year it has been in operation. Schools in other cities which formerly had such a grouping program have moved in practice to two or three levels of ability or to heterogeneous grouping. A few schools attempt to identify the superior pupils in order to enrich the program within the normal class. These schools often provide consultants that advise the teachers on ways to help the talented.

Use of Community Resources

Cooperative Planning and Evaluating of Program

Parent groups in many communities are studying the possibilities of providing more adequately for the superior children in their schools. Educators who work with such groups find that this is a source of assistance both in planning and evaluating a program. Worthwhile contributions have been made by parent groups at Alameda County, Calif.; Winnetka, Ill.;[40] and Indianapolis, Ind. The California Congress of Parents and Teachers issues a booklet for study groups wishing to investigate the problems of the gifted child.[41]

Local organizations of parents have been helpful to junior high schools in helping to interpret the general philosophy and program to the public, through issuing publications written by parents who have studied the school.[42]

Very often superior children can be helped to grow in a vocational or avocational interest by arranging for them to meet or work with people in the community with similar interests.[43] Bringing in "outside speakers" for school assemblies or to talk to classes proves worthwhile. Almost all school administrators and teachers have found that lay persons are willing to give time to help superior children. Often such persons become enthusiastically absorbed in helping these children and go far beyond the scope of the original request.

Whether the community should be involved in a school activity or not depends on many factors. In some cases the goals may be reached

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[40] Lloyd, Mary Norris. Parents are a Valuable Resource. *Educational Leadership*, 11: 384-388, March 1954.

[41] Lloyd, Mary Norris. *Study of the Gifted Child*, Los Angeles, Calif.: California Congress of Parents and Teachers.

[42] *The 80 Bulletin*, issued by The Parents Association of the Mosholu Parkway Junior High School (No. 80), The Bronx, N. Y.

The Man of the Winnetka Public Schools, issued by the Parent-Teachers Association of Winnetka, Ill.

Junior High Digest, issued by the Home and School Association of the Bloomfield Junior High School, Bloomfield, N. J.

[43] Havighurst, Robert J. A Community Youth Development Plan. *School Review*, 59: 427-436, November 1951.

more efficiently through classroom procedures that do not directly involve parents. At times it may be desirable for the teacher to plan only with experts in certain areas. Lay persons may not have the information prerequisite to decisions in specialized areas. Many of these facets of school-community relationships need to be considered in deciding what planning should be done with parents, and when. However, it is desirable for parents and teachers to plan the *general goals* of the school with cooperative procedures for implementing them. This is being done successfully in many communities. No amount of academic seclusion will prevent the community from evaluating the school program. If the general goals of the school are cooperatively planned by teachers and parents, the community is more likely to judge the school in terms of these goals rather than the standards of the "good old days." If there is cooperative evaluation of the progress toward these goals, there may be more sympathetic understanding of plateaus of achievement with suggestions for improvement.

Cooperation with Parents of Superior Children

Theories vary widely as to how to handle the problem of school relationships with the parents of a superior child. For some reason many people believe that a child gifted in athletics or the arts is to be praised and encouraged, while an intellectually superior child is to be regarded with suspicion and kept from an awareness of his abilities and potentialities. In some cities, information that a child is superior is never revealed to parents. This is doubtless a reaction to the kind of school program which creates an "education for the elite" and breeds snobbery and maladjustment.

In one high school the principal sent a letter to the parents of the talented pupil stating that their child was a near genius and would be placed in a special class. A few days later one pupil referred to a boy as "brains." The boy was asked how he got the name and he replied, "I am a genius and I have a letter to prove it." He thereupon pulled the well worn letter from his pocket. The principal and teachers found it rather difficult to help many of these pupils secure peer approval.

But there is a middle ground, and many schools have an intelligent partnership of parents and teachers working together in every way to help the superior child. For example, San Diego parents are invited to a conference with school administrators, psychologists, counselors and teacher-consultants and they are given a handbook describing all types of special education.[44]

[44] Barbour, Richmond, *Educational Offerings for Exceptional Children*. San Diego, Calif.: City Schools, 1958.

Some administrators have found that many difficulties in public relations vanish when they stop talking about "gifted children" and use such an expression as "fast readers." Terminology used to describe the superior is relatively unimportant, but doing something for them is what matters.

The School Staff

Developing a Program for the Superior Pupil

No standard formula can be applied in all schools to set up a program for the superior child. Each junior high school that tries to meet this challenge by a plan to suit the local situation must therefore begin with a study of the needs, resources, and possibilities of both school and community. This self-study and its subsequent planning are functions for which every person on the school staff should feel a share of responsibility.[45] While no school should attempt wholesale imitation of what has been done elsewhere, it can learn much from studying programs already underway in other schools. Some elements of those programs may prove to be the answer to portions of the local problem. Needless repetition of identical experimentation can also be avoided in some instances. Very often faculty groups wishing to improve their curriculum for the superior child find that most of what they decide to do will also help improve the curriculum for all the children. The converse is also true: If a faculty earnestly seeks to create the best possible school for all the children, then the needs of the superior child are recognized as part of the total school situation, rather than as something apart from it. Probably the best thing any faculty could do would be to begin with a study of their junior high school as a whole and how it serves its pupils.[46]

In planning a program it is wise to include all teachers in the school. Modesto, Calif., does this and finds that a variety of viewpoints helps to build a richer program, with strong support for and cooperation with the plans. One school in Tennessee found it profitable to study a plan during four weeks and to include not only teachers but custodians, bus drivers, and cafeteria workers.

Study groups of representatives from several schools have proved to be valuable. The Metropolitan Association for the Study of the

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[45] Berthold, Charles Albert, *Administrative Concern for Individual Difference*. New York: Bureau of Publications, Teachers College, Columbia University, 1951.

Oliver, Albert I., Administrative Problems in Educating the Gifted, *The Nation's Schools*, 43: 46-48, November 1949.

Pritchard, Miriam, Total School Planning for the Gifted Child, *Exceptional Children*, 18: 107-110; January 1952, 143-147, February 1952, 176-180; March 1952.

[46] Cooperative Educational Planning Program. *Guides to Curriculum Building: Junior High School Level*. Madison, Wis.: State Department of Education, 1950.

Noar, Gertrude, *The Junior High School—Today and Tomorrow*. New York: Prentice-Hall, Inc., 1953.

Gifted, with representatives from several schools, meets at Hunter College, New York City, about seven times a year to study and discuss such problems as: guidance for the gifted, curriculum and articulation, role of the parent, summary of research, financing, and next steps in a program. A number of suburban schools are represented on the Committee for Exceptional Children of the Metropolitan School Study Council, which has headquarters at the Teachers College of Columbia University, New York City. A similar group of schools near Philadelphia has formed the Suburban School Study Council. One of the problems studied by this organization since 1948 has been the education of the gifted.[47] At present the organization is preparing a handbook of recommended practices for its member schools.

It is axiomatic in good curriculum procedure that what is being done must be reexamined and evaluated continuously, for the only thing which is true from year to year in any educational program is that no two semesters find exactly the same conditions prevailing within the school. Pupil and teacher personnel change, the community which the school serves does not remain static, and our society as a whole is certainly anything but stable. All of this change affects children's needs and demands constant vigilance to keep educational programs adjusted to those needs. A program for superior children must be flexible enough to be adjusted easily to whatever revision and adjustment appears necessary from time to time. Portland, Oreg., and San Diego, Calif., have provided for this kind of continuing evaluation as a regular part of their programs.

Selecting Teachers for the Superior Pupils

One of the administrator's difficult and important responsibilities is that of selecting teachers who by training and temperament are qualified to teach superior pupils, either in heterogeneous classes or in special groups. A committee in Passaic, N. J., drew up a list of characteristics they considered to be ideally essential in the teacher of the gifted.[48]

Administrators at Niagara Falls, New York, have found that in selecting teachers for very able children it is desirable to seek out those who have made worthwhile collections of corollary materials for their classes. In Portland, Oreg., a survey of teachers' interests and hobbies is made to obtain information that will be useful in planning staff assignments.

The Will Rogers Junior High School in Long Beach, Calif., found that many teachers who had made excellent contributions to the

[47] Suburban School Study Council. *Guiding Your Gifted.* Philadelphia, Pa.: Educational Service Bureau, School of Education, University of Pennsylvania, 1950.
[48] See appendix F, p. 55.

program planning requested that they be eliminated from consideration for assignment to classes of superior pupils. Several of these teachers stated that they were willing to help others but were not interested in doing this kind of teaching themselves. This might indicate a possible way of eliminating disappointment and resentment arising from appointments made arbitrarily.

In-Service Aids for Teachers

Teachers entering a school system for their first assignments cannot be assumed to have any better preparation for facing the problems of the superior child than are teachers with experience. Teacher-training institutions in general do not have programs for helping their students in this direction. A nation-wide survey made by the Education Department at Hunter College, New York City, revealed that not much attention has been given to this problem in teacher education and certification, but that there is evidence of a growing concern among administrators for their new teachers to have had such training.[49]

Regardless of what teacher-training institutions may do, in-service education for classroom teachers in all aspects of public school education is always needed. In most systems, classes are large and demands upon teachers' energy and time are great. This makes it imperative to give the teacher every possible assistance, both in planning and in putting into practice, provisions for the superior child.

Consultants.—One of the most effective means of aiding classroom teachers is to provide a teacher-consultant who visits classes regularly. Unless some such service is established, the enrichment of the superior child's education, whether in homogeneous or in heterogeneous groups, must be left to the resources of individual teachers. This does not always produce the best possible results. The typical pattern for providing a teacher-consultant is to appoint a teacher to the position for a period of three or four years, at the end of which time he returns to classroom teaching. This insures that he will not get too far away from the viewpoint of one who is actively engaged in working directly with children. Portland, Oreg., has several such people aiding with the gifted child project. At Passaic, N. J., the supervisor of instruction for junior high schools has a list of superior children in all schools and works closely with teachers in enrichment provisions. Lafayette Parish, La. has a roving teacher who visits a few schools to help teachers and small groups of children, grouped according to their problems.

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[49] Wilson, Frank T. Preparation for Teachers of Gifted Children in the United States. *Exceptional Children*, 20: 78-80, November 1953.

The San Diego, Calif. teacher-consultant maintains case records of individual gifted children who have emotional or social adjustment problems. The aim is to help these children achieve emotional security, social adjustment, and improved academic status, in that order. In most cases, when the first two objectives have been achieved, there is an almost inevitable improvement in school achievement. The teacher-consultant visits the classes of each child at least once every 15 days, and helps both child and teachers with the child's individual adjustment problems. There is a budget allotment for buying materials not supplied regularly, and the teacher-consultant has the responsibility of keeping informed as to new materials and research findings pertinent to the problems at hand. He also has access to all departments of the school system and can draw upon the resources of the instructional aids department, the guidance and health services, psychologists, psychiatrists, and all departmental supervisors.

Local Studies.—Many school districts have groups that study past achievements and collect descriptive accounts of successful enrichment practices. Several districts issue the results of these studies, along with suggestions for future efforts, to school staffs to help them in their work.

In 1951 the teachers of the Long Beach public schools and their superintendent began an intensive study of the superior pupil. Their immediate goal was to determine how to identify this child and to compile some effective practices in providing for his needs. The deliberations of the various committees were mimeographed and circulated among the teachers for their suggestions and criticisms. In 1952 a pamphlet, *The Very Superior Pupil*, was produced. The contents of the publication are indicated by the following headings: Definition of the Very Superior Pupil, Identification of the Very Superior Pupil, Use of Confidential Data Sheets, Instructional Practices, and Samples of Enrichment Practices.

Similar studies have been made by the school systems of Modesto, Santa Barbara and San Diego, Calif.; and Passaic, N. J. These are mimeographed materials not available for general distribution. Indianapolis, Ind., is noteworthy for the abundance of helpful materials it issues to its local teachers on all aspects of the educational program.

Workshops.—In addition to in-service programs during the school year, some systems provide for summer workshops where, without the distractions of busy school in session, consultants help plan for the following year. Teachers who work with the Gifted Child Project of Portland, Oreg., public schools do much of their preparation during the summer for the diverse activities carried on during the next school year. The Long Beach, Calif. teachers who wish to investigate the

possibilities of enrichment may attend a summer workshop set up especially to aid them.

Visits to Other Schools.—Grants enabling teachers to take brief leaves of absence for the purpose of visiting other schools to observe practices are possible in some cities fortunate enough to have lay groups willing to underwrite such activities. In Indianapolis, Ind., the Junior League helped institute a program for superior children by providing funds for teachers to spend time in other cities observing programs already established. The H. C. Frick Educational Commission in Pittsburgh, Pa., finances trips by both administrators and teachers, and during the school year of 1953–54 several Pittsburgh educators visited schools in other cities to learn about provisions for the intellectually superior.

Guidance Services

Of primary importance to both children and teachers is the necessity for adequate guidance services. The number of vital decisions made by junior high school children is evident to all, and it is the function of guidance to see that those decisions are made with full awareness of every possible choice and its consequences. Superior children very often have a wide range of possible choices in deciding about future educational and vocational planning, and should have sympathetic counseling available whenever needed.

Teachers must have available all possible information about their pupils if they are to work with them in classroom situations and to help them with individual problems. Here again, the issue of the teachers' limited time enters the picture, and it is obvious that information should be given to them in the most efficient and usable manner. An excellent form for putting such data into the hands of classroom teachers has been developed in Baltimore, Md. A class analysis chart for each class, reproduced by a photostatic process, is distributed to the teachers. This chart shows, for pupils in a seventh grade class, the following items: former school, chronological age, intelligence test score and I. Q., relative placement on an I. Q. distribution chart, and grade placement distributions for reading and arithmetic scores on standardized tests.

It is equally important that guidance personnel have adequate information about pupils when they talk with parents. At Hawthorne Junior High School in Wauwatosa, Wis., a data sheet was devised which the teachers can fill in quickly and give to the counselor before an interview with parents.[29]

[29] See appendix C, p. 87.

The teacher or counselor who works with adolescents needs to be aware of the problems which beset children at this age.[51] Some schools, for example, the junior high school in Tucson, Ariz., give inventory checklists to pupils to help in determining the special problems of adolescence that are confronting the pupil body. This same school has developed a handbook on guidance and counseling to assist the teachers.

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[51] Segal, David, *Frustration in Adolescent Youth*. Washington, U. S. Government Printing Office, 1951. (Office of Education, Bulletin 1951, No. 1.)

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Appendix A

Long Beach Public Schools

Office of Counseling and Psychological Services

Confidential Data Sheet—VSP

Name _____ School _____ Date _____

Sex _____

Birthdate _____ Grade _____ *Index

Test	M. A.	I. Q.	Date

Most recent tests	Test	Score	Gr. Equiv. or percentile	Norm	Date
Reading					
Arithmetic					
English mechanics					
Language usage					
Other					

Spelling (local spelling test) Number right _____ City average _____

	English (Inc. Rdg.)	Soc. St.	Math.	Sci.	Foreign Lang.
Average mark:					
1951–52					
1952–53					
1953–54					

*Two most recent tests.

Special abilities, if any ----------
(Art. Music. Drama. Mechanical, etc.)

Work habits ---------- Library usage ----------
Superior. Average. Poor. Superior. Average. Poor.

Citizenship ---------- Comment: ----------
Superior. Average. Poor.

Attendance ---------- Hobbies ----------
Regular. Irregular.

Date of *first* enrollment in Long Beach schools ----------
Private lessons, if any ----------
Does pupil plan to go to college? ---------- What college? ----------
Yes. No. Undecided.

Vocational plans, if any ----------
Known gifted members of family ----------
Occupation of parents ----------

Health ----------
Excellent Good Poor

Has satisfactory conference with parents been held?

By Counselor ---------- By teacher ----------
Date Date

Would this pupil be benefited by acceleration? Yes ____ No ____ Comment:

INTERVIEW WITH PUPIL

Dates	

NEXT STEPS RECOMMENDED

NOTES ON FOLLOW-UP

Dates	

Appendix B

Modesto City Schools

Very Able Student

Please consider the student in terms of:

1. Intellectual talent.
2. Artistic talent.
3. Social leadership.
4. Creative intelligence.
5. Additional talents.
6. Performance in the above fields.

Please insert any anecdotal materials on separate sheets of paper. Short, pertinent examples of the student's work would be helpful.

Last name..... First name..... Middle initial

Date of this report --- School --- Grade ---	Teacher's comment:
Date of this report --- School --- Grade ---	Teacher's comment:

Date of this report School Grade	Teacher's comment:
Date of this report School Grade	Teacher's comment:
Date of this report School Grade	Teacher's comment:
Date of this report School Grade	Teacher's comment:

Appendix C

Santa Barbara City Schools

Supplementary Identification of the More Capable and Talented Students in the Secondary Schools

Please fill in only the name, grade, and school. Date _____

Name _____ Grade ____ School _____ Birthdate ____ Phone ____

Father's name _____ Address _____ Occupation _____

Mother's name _____ Address _____ Occupation _____

Teacher _____

The more capable and talented students are:

1. Those who are unusually capable scholastically, do outstanding work in the classroom, have excellent study habits and organization, show unusual aptitude in ability and achievement tests, and are socially adjusted. (Easily identified.)
2. Those students who have potential in general ability but who are not so performing or who have not developed in social realms. (Usually not easy to spot because of emotional problems, environmental limitations, etc.)
3. Those students who have specific talents in special fields such as art, music, industrial arts, homemaking, and physical education. These students may or may not show general scholastic ability.

Will you please comment about this particular student in regard to social adjustment, work habits, leadership, etc.

The following is a checklist of identification characteristics and abilities. Please check *those* in which this student is outstanding:

---- Unusual talent in art.
---- Unusual talent in music.
---- Outstanding social aptitude.
---- Superior mechanical ability.
---- Shows scientific ability.
---- Intellectual curiosity.
---- Vocabulary which is picked up naturally.
---- Creative ideas.
---- Quickness to see relations.
---- Unusual ability in any areas not mentioned.
---- Name of ability.

---- Wide information about many things.
---- Several hobbies.
---- Enjoyment of reading.
---- Reads extensively.
---- Shows good organization in work.
---- Grasps new ideas readily.
---- Thinks logically beyond years.
---- Does abstract thinking and generalising.
---- Is a leader.
---- Makes and retains many friends.

Intelligence tests						Achievement tests			
Name	Grade	Date	C. A.	M. A.	I. Q.	Reading			
						Name	Grade	Date	G. P.
						Arithmetic			

Other comments on school history.....

.....

.....

.....

.....

Family information

Other children in the family:
Name..... Age.....
Name..... Age.....
Financial Status: Income.....
Ownership of home.....
Ownership of car.....
Socio-economic level.....
Family Council: Yes.... No....

Educational History of Parents:
Mother High School....College....
Father High School....College....
Family Recreational Activities:
Reading..... Theater.....
Music..... Others.....
Music (classical)..... .....
Trips..... .....

Student's hobbies	Recreational activities	Clubs

Supplementary Identification of the More Capable and Talented Students—High School

Three categories of the more capable and talented student:

1. Those who are unusually capable scholastically, do outstanding work in the classroom, have excellent study habits and organization, show unusual aptitude in ability and achievement tests and are socially adjusted. (Easily identified.)
2. Those students who have potential in general ability but who are not so performing or who have not developed in social realms. (Usually not easy to spot because of emotional problems, environmental limitations, etc.)
3. Those students who have specific talents in special fields such as art, music, creative design, interior decorating, dance, and the mechanical and scientific fields. *These students may or may not show general scholastic ability.*

Checklist of identification characteristics

Intellectual curiosity.
Vocabulary which is gained naturally.
Creative ideas.
Quickness to see relations.
Wide information about many things.
Several hobbies.
Originality.
Reads extensively.
Shows good organization.
Grasps news ideas readily.
Thinks logically beyond years.
Does abstract thinking and generalizing.
Is a leader.
Makes and retains many friends.
Unusual talent in art or music.
Unusual mechanical or scientific aptitude.
Creative talent in the dance.
Shows creative talent in designing and interior decorating.

Other characteristics suggested:

Please list names of students who you feel should be referred. Will you please note by their names any *special* talents in which you feel they are outstanding.

Outstanding students doing an outstanding job.

1.
2.
3.
4.
5.
6.
7.
8.

Students with the potential but who are not working up to ability and need further help.

1.
2.
3.
4.
5.
6.
7.
8.

Teacher's name_____

Date_____

Identification of the Gifted Students
Elementary Schools

Directions: In order to save you time, please fill out only the parts which are starred (*).

*Name_____ Grade____ Birthdate____ Telephone____ *School____
Father's name_____ Address_____ *Occupation_____
Mother's name_____ Address_____ *Occupation_____

Principal or Teacher's Recommendation:

We would like you to pick out the students who show *unusual* scholastic or social ability, or talent in music, art, creative writing, and mechanical activities. All of these characteristics will not be found in one child. We are merely seeking your opinion in the beginning survey of those children who you feel are outstanding.

A few identification hints are:

1. Unusual curiosity—asks many questions.
2. Completes work quickly and seeks other activities.
3. Shows interest in several hobby areas.
4. Reads widely.
5. Shows unusual social ability and leadership organization.
6. Is unusually talented in music, art, creative writing, knowledge and performance in science.
7. Is superior in organization in social studies.

Please comment below. These comments may show either progress or areas of needed improvement. If you need extra space, feel free to use the back.

*His academic growth shows that_____
_____
_____
*His social adjustment shows_____
_____
_____
*Special talent in_____shows that_____
_____
*Work habits are_____
_____

DO NOT FILL IN BELOW

Intelligence tests						Achievement test			
Grade	Name	Date	C. A.	M. A.	I. Q.	Name	Date	G. P.	Grade

Appendix D

San Diego City Schools

Department of Guidance, Psychology Section

Maturity Rating Scale for Gifted Pupils

Date.....

Name.....

School..... Grade.....I.Q.....

Put a check mark on each line to indicate your estimate of the best answer to the question for this child. Return to Helen LeHew, Department of Guidance, as soon as possible.

MATURITY RATING SCALE

1. Is he interested in his schoolwork?

   ---------- ----------
   No interest Very interested

2. Does he show interest in organized extra-curricular activities (as clubs, Scouts, orchestra, etc.)? Specify which.

   ---------- ----------
   No interest Very interested

3. Does he show interest in hobbies (other than organized activities)? Specify which.

   ---------- ----------
   No interest Very interested

4. How easily does he make friends?

   ---------- ----------
   Not easily Very easily

5. How much leadership ability does he have?

   ---------- ----------
   None Very much

6. Does he enjoy games and play with other children very much on the playground?

   ---------- ----------
   Never Always

7. How acceptable is his behavior, according to ordinary social standards?

   ---------- ----------
   Unacceptable Very acceptable

8. Is his personality attractive and pleasing?

Unattractive ---------- Very attractive

9. How well does he mind?

Never ---------- Always

10. Is he socially withdrawn or outgoing?

Withdrawn ---------- Outgoing

A. How does he spend his leisure time in school?
B. How does he spend his leisure time outside of school? (Except as covered in questions 2 and 3 above)
C. What nervous mannerisms, if any, does he have?
D. To what extent is his behavior typical of his sex group?
E. What types of behavior does he show when he is frustrated, doesn't get his way, or is hurt or disappointed?

Appendix E

Nichols School, Evanston, Ill.

Mathematics Group Classification..... Date.....

Name..... Date of birth.....

Address..... Phone.....

Recent test results (include date)

Achievement			Tot. Math.	% Prog.	Read. Comp.	Mental Abilities		
Gr.	Reas.	Fund.				Tot. Ach.	I. Q.	E. Q.
6								
7								
8								

Recommendations of previous teachers:

Attitude in mathematics.....

Recommended group placement.....

Additional remarks.....

School.....

Teacher's name.....

Date.....

Attitude in mathematics.....
Recommended group placement.....
Additional remarks.....

Attitude in mathematics.....
Recommended group placement.....
Additional remarks.....

Attitude in mathematics.....
Recommended group placement.....
Additional remarks.....

Appendix F

Passaic City Schools, Passaic, N. J.

The Good Teacher of the Mentally Gifted

A. Is alert to the total problem:
   1. Has a complete understanding of the identification of the gifted.
   2. Has an awareness of the problems encountered by the gifted.
   3. Is aware of the personality adjustment needs of the gifted, thus encouraging good mental health and rich social living.
   4. Feels responsible to challenge and develop the maximum talents of the superior child for the benefit of:
      a. The individual's happiness.
      b. The community welfare.
      c. The survival of democracy through the development of intelligent leaders and creative personalities.

B. Possesses these superior personality traits:
   1. Must be
      a. Vibrant.
      b. Sensitive.
      c. Humble.
      d. Enthusiastic.
      e. Pleasant.
      f. Encouraging.
      g. Adaptable and flexible.
   2. Must have:
      a. Sense of humor.
      b. Curiosity.
      c. Many and varied interests.
      d. Good mental health.
      e. An abiding love of children.
      f. Ability to share the interests of others.

C. Has attained recognised professional standing through
   1. Experience with all types of children
   2. Intellectual ability.
   3. Superior knowledge of subject matter.
   4. Ability to guide and counsel, not dominate.
   5. Ability to stimulate and challenge pupils.
   6. Discrimination in setting goals.
   7. Understanding of the child's viewpoint in order to foster successful teacher-pupil planning.
   8. Establishment of pupil-teacher rapport and pupil-pupil rapport.
   9. Handling human relationships.
   10. Skill in stimulating group interaction and participation.
   11. Interest in professional growth.

NOTE.—Although these attributes apply to all teachers, they are especially essential for the teacher of the gifted.

Appendix G

Hawthorne Junior High School

Teacher's Report for Homeroom Adviser and Parent Conference

From..... To.....

Regarding..... Date..... Subject.....

Kindly dot the correct rating of the traits that you feel you can evaluate and connect all dots in each section

	Unsatisfactory	*Average*	*Very satisfactory*
Achievement:			
1. Individual rating according to ability	.....	.....	.....
2. Individual rating according to class standard	.....	.....	.....
3. Interest in subject field	.....	.....	.....
4. Study habits	.....	.....	.....
5. Approximate mark	.....	.....	.....
6.	.....	.....	.....
Emotional and social maturity:			
1. Concern for the welfare of others	.....	.....	.....
2. Respect for property rights	.....	.....	.....
3. Behavior toward the opposite sex	.....	.....	.....
4. Readiness to accept criticism	.....	.....	.....
5. Participation in class activity	.....	.....	.....
6. Response to authority	.....	.....	.....
7. Capacity for hard work	.....	.....	.....
8. Prompt in completing assignments	.....	.....	.....
9. Prompt in keeping appointments	.....	.....	.....
10.	.....	.....	.....
Physical status:	*Extremely noticeable*	*Noticeable*	*Not noticeable*
1. Nervousness	.....	.....	.....
2. Sluggishness	.....	.....	.....
3. Inadequate rest	.....	.....	.....
4. Poor posture	.....	.....	.....
5. Difficulty in speaking	.....	.....	.....
6. Hearing defect	.....	.....	.....
7. Eye strain	.....	.....	.....
8.	.....	.....	.....

Additional comments.....

.....

Due..... Signed.....