THE UNIVERSITY OF MANITOBA

# A FOLLOW-UP STUDY OF THE HIGH SCHOOL PERFORMANCE OF STUDENTS WHO WERE MEMBERS OF THE INAUGURAL MAJOR WORK CLASSES IN WINNIPEG



BEING A THESIS SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION

BY

NAOMI LOUISE HERSOM

WINNIPEG, MANITOBA

MAY, 1962

# THESIS ABSTRACT

## The Problem

The Winnipeg School Division offers a special program for intellectually gifted students in grades four through nine in its Major Work classes. When students who had been enrolled in the special classes entered high school along with equally gifted students from regular classes it was proposed to compare the high school performance of the Major Work class students with that of their non-Major Work class peers.

## Selection of Subjects

The Major Work sample group was drawn from the sixty students who were members of grades four and five Major Work classes in September, 1954. At the conclusion of the program in grade nine, those students who registered in Winnipeg senior high schools for grade ten constituted the sample. The control group students were matched for sex and junior high school attended. The two groups did not differ significantly with respect to chronological age, intelligence, and academic achievement in grade nine. A

total of forty-five pairs of students was used in the study.

## Treatment of the Data

The criterion measures.-- The marks obtained on grade ten school examinations at Easter, and on grade eleven Department of Education examinations in June, were used to measure academic achievement. All marks were standardized to Z-scores for purposes of comparison.

The Watson-Glaser Critical Thinking Appraisal was administered to both groups while in senior high school.

The Quincy Development Project Behaviour Description Charts were completed by the home room teachers of the students involved in the study.

Analyses of the data.-- The significance of the differences between the mean Z-scores of Major Work group students and the mean Z-scores of control group students was computed by the t-test after homogeneity of variances had been proved by the F test. The t-test was also used to test differences between mean scores on the Watson-Glaser Critical Thinking Appraisal.

The chi-square test was applied to the ratings made by classroom teachers on the Behaviour Description Chart.

## Findings

(1) There is a significant difference between intellectually gifted students who have been members of Major Work classes and intellectually gifted students who have not been members of Major Work classes in high school achievement as indicated by examination marks in grade ten Literature, grade eleven Literature, and grade ten French.

(2) There is no significant difference between intellectually gifted students who have been members of Major Work classes and intellectually gifted students who have not been members of Major Work classes in high school achievement as indicated by examination marks in grade ten Composition, Geography, Mathematics, Science, and grade eleven Composition, History, Mathematics, Chemistry, Physics, and French.

(3) The difference between groups of intellectually gifted students who have been members of Major Work classes and intellectually gifted students who have not been members of Major Work classes in overall academic achievement in grade ten as indicated by average standard scores closely approached the five per cent level of statistical significance.

(4) There is no significant difference between intellectually gifted students who have been members of Major Work classes and intellectually gifted students who have not been members of Major Work classes in the ability to think critically as measured by the Watson-Glaser Critical Thinking Appraisal.

(5) There is no significant difference between the numbers of intellectually gifted students who have been members of Major Work classes and the numbers of intellectually gifted students who have not been members of Major Work classes in various categories of personality traits as rated by classroom teachers on the Behaviour Description Chart. The traits rated were: leadership, withdrawal, and aggressiveness.

## Conclusions

The findings of this study suggest that the Major Work program in Winnipeg has succeeded in helping intellectually gifted students make better use of their talents in high school. Where special emphasis in the Major Work classes has been placed on Literature by means of Reading Clubs, for example, and on French, through early instruction, high school academic achievement in these subject areas has

been improved even after special class treatment had been discontinued.

The fact that gifted students from Major Work classes were not rated differently from gifted students from regular classes on behaviour traits by their home room teachers in high school indicates that the special program has not adversely affected the personal development of its members.

Academic achievement in high school falls short of measuring the effectiveness of the Major Work program. Such intangible benefits as the opportunity to develop leadership abilities, to carry on independent research, to practise oral skills, to benefit by the stimulation and challenge of associating with a group of intellectually gifted students do not lend themselves to measurement.

## ACKNOWLEDGEMENTS

It is difficult to acknowledge adequately all the people who have contributed to this study.

Professor W. H. Lucow has given generous assistance throughout its preparation. Under his guidance, the writer was able to check the calculations on the Bendix G-15 computer at the University of Manitoba.

It would have been impossible to complete the thesis without the kind co-operation of the Superintendents of the Winnipeg School Division and the Director of Special Education.

To Inspector M. Ewanchuk, the Department of Education staff, the high school principals and teachers, and the school secretaries, my grateful thanks for their assistance in providing necessary data so willingly.

N. L. Hersom

TABLE OF CONTENTS

LIST OF TABLES

# CHAPTER I

# THE PROBLEM OF EVALUATING THE MAJOR WORK PROGRAM IN WINNIPEG SCHOOLS

## Purpose and Hypothesis

The purpose of this study was to investigate the academic achievement of high school students who had been members of the Major Work program in Winnipeg schools at the elementary and junior high school levels. The high school examination marks of members of the three Major Work classes established in September, 1954, were compared with those of a control group of equally superior students who were not in the special program during that period. It was proposed to discover whether the Major Work program had succeeded in helping gifted students make better use of their abilities.

The null hypothesis tested was: There is no difference between superior students who have had Major Work class treatment and equally superior non-Major Work class students in academic achievement in senior high school where both groups have merged into the same program.

## The Major Work Program in Winnipeg[1]

Need.-- During the past decade increasing emphasis on the need to recognize the gifted members of society has resulted in increased pressure on the schools to provide for the education and training of gifted children. In Winnipeg an enrichment program was started in 1954 at the grade four level, and consisted of three special classes comprised of pupils from several schools. The classes were planned to challenge and develop the gifted children by providing more activities, and an opportunity to benefit from the stimulation of associating with their peers. This program grew during the succeeding years until there were twenty-seven elementary classes and twenty-four junior high school classes in 1961-62.

Identification.-- Screening is begun at the grade three level, when all elementary school principals submit the names of pupils who score 120 or more on a group intelligence test, and of any other pupils who in the opinion of school personnel are possible candidates. These children are given the Primary Mental Abilities (PMA) test by staff members of the Child Guidance Clinic.

---

[1]Arthur D. Thomson, "The Education of the Gifted in Winnipeg," Study Pamphlets in Canadian Education, No. 24 (Toronto: Copp Clark Co., Ltd.), pp. 1-7.

Selection and placement.-- Pupils who score 125 and above on the PMA test are investigated further. The teacher and principal are consulted about the child's emotional and social development, and detailed reports are submitted to the Director of Special Education who is responsible for the final selection of candidates. The parents of these children are advised of the selection and are asked for their consent to special class placement.

Each year the principals of elementary schools are also asked to recommend candidates for the Major Work program from the grade four, five, and six classes as well as from the grade three classes. If these pupils are found to be eligible after testing, they are placed in Major Work classes at their own grade levels. This selection procedure continues in the junior high schools.

At the elementary level, some of the pupils must be transferred to other schools because there are not enough gifted children in any one elementary school to make up a special class of twenty-five. In some cases bus fare is provided.

Program.-- In the elementary school, the Major Work program places emphasis on extended activities in language, literature, creative writing, dramatics, oral reports, science, and social studies. Conversational French and

typing are extra subjects. The children are given opportunities to chair discussions of various types, and to accept responsibility for the planning and organization of class activities. Evaluation of each other's performance is another important aspect of the program. It is also considered essential to provide special training in research skills and to encourage independent study. An extra allotment of money for library books and other materials is made for each class.

In junior high schools the Major Work program is continued.

At the senior high school level no formal Major Work program exists, but each school provides enrichment for gifted students whether or not they have been enrolled in the Major Work program. Some of the gifted students carry an extra option but some choose an enriched program without extra subjects.

Teacher selection.-- Teachers of Major Work classes are selected after consideration of such qualifications as: successful teaching experience, academic and professional standing, flexibility, and ability to deal with individual differences. Special qualifications in art, music, the language arts, or science, may be factors in selection.

Bursaries are provided by the Winnipeg School Board for Major Work class teachers to take summer courses in the education of gifted children. Throughout the school year an in-service program enables the teachers to share ideas and to discuss the various aspects of the teaching of the gifted.

Evaluation.-- In 1958 the first formal attempt to evaluate the program was made by means of questionnaires sent to both parents and pupils. The overall result was reported as favourable.[2] Parents said they particularly liked the improvement in habits and attitudes, and in the intellectual development of their children. The students themselves rated the benefits derived from the program higher than their enjoyment of it. Some reserve was noted concerning the curtailment of friendships and disturbed relationships within the community. The Report was summarized in part as follows:

> The material gathered in this report indicates that the pupils in the major work classes have been able to maintain a high standard of educational progress while participating in a program designed to allow them greater scope in developing their

---

[2]Superintendent's Department, Report on Major Work Classes in Winnipeg Public Schools (Winnipeg: School District of Winnipeg No. 1, November, 1958), 17 pp. (Mimeographed.) See Appendix A.

> potential strengths. Although the school has accepted the responsibility of providing experiences in aspects of the child's life and development other than academic, the major task of the public educational system continues to be the development of his intellectual gifts.
>
> That the program needs constant attention and improvement, that evaluating instruments are far from perfect, that some children are selected for the classes and prove incapable of meeting the demands of the program, that some children of highly able minds may not be discovered and included in the program; those things are recognized and are a matter of continuing concern.
>
> The major work classes are meeting, in part, the need for an augmented program for those children whose superior potential makes the regular program unchallenging.[3]

Where the Report on Major Work Classes in Winnipeg Public Schools was a descriptive and qualitative account, this thesis study attempts an objective and quantitative analysis of the academic implications of the Major Work program in Winnipeg.

## Population and Samples

For purposes of the study, numerical evidence has been obtained about groups of gifted students who are considered to be samples of the larger population of the gifted in Winnipeg schools. By definition, the generalizations

---

[3] Ibid., pp. 16-17.

about a population are drawn by statistical inference from the numerical information gained from sample groups.[4] The samples were drawn in order to test the hypothesis that differences between the means of the sample group of Major Work class students and of the sample group of non-Major Work class students were so great that it would be unreasonable to expect that the differences occurred by chance. Thus it could be inferred whether or not the Major Work program has better prepared gifted students for senior high school than the regular class program.

The survey is concerned with gifted children who were in grades three and four in the spring term of 1954. The population consists of those who were in Winnipeg schools at that time, and those gifted children who entered the Winnipeg school system before 1959 and who were at the same grade level as the pupils in the original classes.

The Major Work group sample.-- The Major Work group consisted of forty-five members of the three original classes who completed the Major Work program to the ninth grade, and who enrolled in a grade ten academic course in a senior high school in Winnipeg. Twenty-three students

---

[4]James E. Wert, Charles O. Neidt, and J. Stanley Ahmann, Statistical Methods in Educational and Psychological Research (New York: Appleton-Century-Crofts, Inc., 1954), p. 103.

were in grade ten during the academic year 1959-60, and twenty-two were in grade ten during the academic year 1960-61.

The control group sample.-- A control group was not selected at the time the first special classes were begun. Therefore, when the grade nine records were being searched for the Major Work group members, a control group was chosen from the regular classes in the junior high schools where Major Work classes were functioning or in neighbouring schools. The controls were matched on the bases of chronological age, sex, junior high school attended, Co-operative School and College Ability Tests scores, and average standing on the grade nine Department of Education tests in Language, Science, Mathematics, and Social Studies.

## Plan of the Thesis

This thesis is an analytical and comparative survey concerned with the assessment of the Major Work program in Winnipeg in terms of school achievement at the high school level, and the behaviour ratings of the Major Work group and control group members by their high school classroom teachers. To the writer's knowledge, such analysis has not

been attempted in the Winnipeg School Division.

Academic achievement of the sample groups as measured by high school examination marks in grades ten and eleven was compared. The hypotheses were tested by the t-test of significant differences between group means after preliminary assumptions of the homogeneity of variances had been tested.

Scores made by Major Work group and control group students on the Watson-Glaser Critical Thinking Appraisal were also analyzed by means of the t-test.

Differences between ratings of Major Work group students and control group students by classroom teachers on the Behaviour Description Chart were tested by Chi-Square.

Chapter II contains a review of pertinent books and articles which deal with the special provisions and programs being used elsewhere in the education of gifted pupils.

The statistical design of the survey is given in Chapter III and is followed by a presentation of the data, their analyses, results and conclusions.

# CHAPTER II

# REVIEW OF THE LITERATURE

## Introduction

This chapter constitutes an investigation of the research findings on many of the aspects involved in the operation of segregated classes for gifted students similar to the Major Work program now offered in Winnipeg schools. The various administrative devices employed in North American schools, the problems in identification, selection, and curricula planning, are reviewed. A summary of these findings is available at the conclusion of the chapter.

## Definitions

When educators write about gifted children the definitions appear in involved paragraphs. In practice, when educators select gifted children for special programs, or for study, a rule of thumb seems to take over, and the top two or three per cent of the school population is chosen. The Dictionary of Education defines "gifted children" in the latter way, but adds that a gifted child may also be one

with outstanding ability in one area, such as art or music.[1]

Some of the writers in the field of the gifted would include the top fifteen to twenty per cent of the school population in academic achievement as well as those displaying distinctive talent in special areas.[2] Ruth Strang states that all children in the gifted category come from an exceptional family background and have had a fortunate childhood in a community environment which favours their development. This combination of circumstances has made possible the development of intellectual and special talents.[3] Getzels would disagree in part. He feels that the schools are missing the truly gifted students who diverge from the accepted definitions, but who are "inner-directed," rebellious, and truly creative.[4] Brown simply

---

[1]"Children, gifted," Dictionary of Education, ed. Carter V. Good (New York: McGraw Hill Book Co., Inc., 1945)

[2]L. A. Fliegler and C. E. Bish, "The Gifted and Talented," Review of Educational Research, XXIX (December, 1959), p. 409.

[3]Ruth Strang, "Psychology of Gifted Children and Youth," Psychology of Exceptional Children, ed. William M. Cruickshank (Edgewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955), p. 483.

[4]Jacob W. Getzels quoted in "Digging the Divergent," Time, LXXIII (June 29, 1959), p. 32.

says that the intellectually gifted child possesses "the ability to learn more in breadth and depth than the average child ... [has] better potential thinking ability than many adults."[5]

For purposes of this review, the terms talented and gifted will be applied to those children who comprise the top five per cent of the school population because, in Winnipeg schools, the Major Work classes represent this group.[6]

## Academic Achievement

Although children may be identified as gifted, school achievement is not necessarily, though often is, superior. It seems to be accepted generally that the gifted children tend to secure higher grades.[7] Terman's results showed that the gifted child masters subject matter to a point forty per cent above his chronological age, that his greatest superiority is in general information, language usage, and reading, and that he is generally more interested

---

[5]Marion V. Brown, "Teaching an Intellectually Gifted Group," Elementary School Journal, XLIX (March, 1949), p. 380.

[6]Thomson, op. cit., p. 3.

[7]Miriam L. Goldberg, "Recent Research on the Talented," Teachers College Record, LX (December, 1958), p. 150.

in abstract rather than practical subjects.[8]

## Personal Development of the Gifted Child

Carlson stated that many gifted individuals grow up to be ineffectual, emotionally immature, and socially useless members of society.[9] This type of statement is common to the generalized criticism of gifted children. Strang suggested that many gifted adolescents are reluctant to use their true abilities in the attempt to be like others, and thus do not develop their full potential.[10] When maladjustment in gifted children does occur, she attributed this to parental pressure and exploitation on one hand, or parental indifference on the other; to lack of opportunity, financial limitations, and poor instruction in methods of study.[11] A Massachusetts child guidance clinic study of gifted children found that the children who were

---

[8]Norma V. Scheidemann, "Gifted Children," The Psychology of Exceptional Children, Vol. I (Boston: Houghton Mifflin Co., 1931), p. 246.

[9]Edith Fox Carlson, "Problems in Educating the Highly Endowed," Journal of Exceptional Children, XIII (April, 1947), p. 201.

[10]Ruth Strang, "Mental Hygiene of Gifted Children," The Gifted Child, ed. Paul Witty (Boston: D. C. Heath and Co., 1951), p. 142.

[11]Ibid., pp. 150-53.

referred had parents who overstimulated them, or who were possessive and overprotective, or who were deferential and afraid of the child's ability.[12] Where there are accelerated programs for gifted children, Wilkins warned that there are accompanying dangers to good social adjustment.[13]

Another basis for the isolation of the gifted child is the fact that others do not share his interests and vocabulary, and it is difficult for him to form satisfactory friendships with his own age mates. Taylor wrote that the skill and knowledge of a gifted individual are of limited value unless he can use them in co-operation with his fellows.[14]

## Provisions for the Gifted

Need.-- Witty urged that even the child who is fortunate enough to come from a stimulating home environment needs "the help of the school in exploring and

---

[12]D. A. Thom and N. Newell, "Hazards of the High IQ," Mental Hygiene, XXIX (January, 1945), p. 66.

[13]Walter L. Wilkins, "High School Achievement of Accelerated Pupils," School Review, XLIV (April, 1936), p. 272.

[14]K. W. Taylor, "Creative Intelligence: Are We Giving It a Chance?" Understanding the Child, XII (June, 1943), p. 16.

enriching his interests and in developing skills and aptitudes."[15] Others have pointed to the toll in potentially superior college students: ten per cent did not enter, thirty per cent did not graduate from college according to the Stanford studies.[16] The blame has been laid at the door of the high schools who fail to recognize gifted students' potentialities and who fail to encourage and stimulate these individuals.[17] Passow claimed that part of the blame should be attributed to out of school factors which affect motivation, but agreed that gifted students should be guided to enroll in suitable courses.[18]

The advocates for special provisions for the gifted argue that these students need a rich background of ideas and training in critical thinking in order to be effective leaders in the future, and therefore require a special

---

[15] P. A. Witty and S. W. Bloom, "The Education of the Superior High School Student," Bulletin of the National Association of Secondary-School Principals, XXXIX (January, 1955), p. 17.

[16] M. R. Sumption, D. Norris, and L. M. Terman, "Special Education for the Gifted Child," The Education of Exceptional Children, Forty-Ninth Yearbook of the National Society for the Study of Education, Part II (Chicago: University of Chicago Press, 1950), p. 274.

[17] Ibid., p. 274.

[18] A. Harry Passow, "The Comprehensive High School and Gifted Youth," Teachers College Record, LVIII (December, 1956), p. 148.

program which cannot be provided for all students.[19] The New York City schools adopted a philosophy which resulted in "a way of teaching directed to training the school intelligentsia to understand, weigh, evaluate, and reject inferior or dishonest reasoning in favour of sound thinking."[20] The Winnipeg School Board has concurred in such arguments and has provided a program for the superior students whose intellectual advantage must not be wasted, but nurtured.[21]

Responsibility of the school.-- Passow wrote that schools generally have accepted responsibility for providing for talented high school students.[22] It has been found that if abilities are present in latent form "they emerge when the school sets learning tasks which require gifted

---

[19]Marguerite C. Peachman, "Attitudes: Their Significance in Education for the Gifted," Journal of Educational Psychology, XXXIII (March, 1942), pp. 183-98; and Leta S. Hollingworth, "An Enrichment Curriculum for Rapid Learners at P.S. 500: Speyer School," Teachers College Record, XXXIX (January, 1938), p. 297.

[20]Helen L. Cohen, "The Program for Gifted Children in New York City," English Journal, XXVI (September, 1937), p. 556.

[21]Winnipeg Free Press, June 24, 1960.

[22]A. H. Passow and A. Tannenbaum, "How Fare the Talented in Our High Schools?" Bulletin of the National Association of Secondary-School Principals, XXXIX (May, 1955), p. 14.

students to perform in accordance with their intellectual capacities."[23]

In some quarters, notably the Massachusetts Institute of Technology and the University of Chicago, concern has been expressed over the fact that exceptional students are being trained not to be exceptional. Weir concluded that the schools destroy initiative and repress spontaneity.[24] Jackson and Getzels described this as failure "to distinguish between convergent and divergent talents -- or, even worse ... to try to convert our divergent students into convergent students."[25]

The whole problem of providing for gifted children must be dealt with by each school system according to their experience and educational philosophies, suggested Youngert.[26]

---

[23]Miriam L. Goldberg, "Recent Research on the Talented." Teachers College Record, LX (December, 1958), p. 151.

[24]John R. Weir, addressing a group of California Institute of Technology and Massachusetts Institute of Technology educators, stated: "By the time the exceptional student reaches college, he has had eight years' training in how not to be exceptional." "Exceptionally Exceptional," Time, LXVII (April 2, 1956), p. 38.

[25]P. W. Jackson and J. W. Getzels, "A New Definition: Giftedness," University of Chicago Magazine, LX (December, 1960), p. 17.

[26]Eugene Youngert, "Is It Desirable to Organize Special Classes for Gifted Students?" Teachers College Record, XXXIX (February, 1938), p. 388.

Some experimented with the use of community resources in the form of trained volunteer workers who worked with gifted children on the bases of their intellectual, artistic, and other special abilities.[27] For both the elementary and high school levels, the writers advocated that the schools provide for the development of special abilities in classes and for opportunities to try out incipient interests. It has also been recommended that tolerance, and respect for the opinions of others be taught.[28] As well, some authorities considered it to be the responsibility of the school to advise parents how their attitudes and relationships affect their child's motivation, and to work for close co-operation from the home in the education of the gifted child.[29] Whatever the program, however, Williams emphasized that its success depended on "the educational leaders most closely connected with it."[30]

---

[27]Paul H. Bowman and others, Mobilizing Community Resources for Youth: Identification and Treatment of Maladjusted, Delinquent and Gifted Children, Supplementary Educational Monographs, No. 85 (Chicago: University of Chicago Press, 1956), p. 174.

[28]Lloyd S. Michael and others, "Secondary School Programs," Education for the Gifted, Fifty-Seventh Yearbook of the National Society for the Study of Education, Part II (Chicago: University of Chicago Press, 1958), p. 265.

[29]Paul Witty, The Gifted Child (Boston: D. C. Heath and Co., 1951), p. 273.

[30]Clifford W. Williams, "Characteristics and Objectives of a Program for the Gifted," Education for the Gifted, op. cit., p. 157.

## Administrative Devices

Acceleration.-- Two broad methods of dealing with the education of the talented have been accepted. Terman and Oden concluded that acceleration is always possible and desirable for the majority of gifted children.[31] Carlson suggested that the gifted child has a need to learn more rapidly and that expanding his knowledge about a particular subject is not sufficient.[32] Justman discovered that academic achievement in junior high school is not affected by acceleration by one year at that level.[33] In Winnipeg schools an acceleration program is used in the primary grades.

Enrichment.-- On the other hand, an enrichment program for gifted children is increasingly being recommended. This is the practice which the Winnipeg schools adopted for their Major Work program. It is prompted by

---

[31]L. M. Terman and M. H. Oden, "Major Issues in the Education of Gifted Children," Journal of Teacher Education, V (September, 1954), p. 231.

[32]Edith Fox Carlson, "Problems in Educating the Highly Endowed," Journal of Exceptional Children, XIII (April, 1947), p. 202.

[33]Joseph Justman, "Academic Achievement of Intellectually Gifted Accelerants and Non-Accelerants in Junior High School," School Review, LXII (March, 1954), pp. 142-50.

the need to provide experiences for which the average or below average child lacks the time, interest, or ability to comprehend.[34] It allows children to read more mature books, and allows the teacher to be more critical and exacting.[35] Norris summed up the arguments with the statement that "enrichment is the best thing we know about teaching to meet the individual needs of these students."[36] She found that most administrative procedures for gifted children recognize that they need to be separated from other children, even if this is only for short periods of time, that the earlier they are challenged the better, that it is wise to encourage special strengths and abilities, and that subject matter is secondary to the building of good habits, attitudes and interests.[37]

Segregated programs.-- In one of the studies made almost forty years ago of the advantages and disadvantages of homogeneous grouping of abilities, the researchers

---

[34]D. A. Worcester, The Education of Children of Above-Average Mentality (Lincoln, Nebraska: University of Nebraska Press, 1955), p. 39.

[35]W. C. Trow, "School Programing for the Intellectually Superior," Education, LXXVIII (March, 1958), p. 433.

[36]Dorothy E. Norris, "Programs in the Elementary Schools," Education for the Gifted, op. cit., p. 225.

[37]Ibid., p. 262.

concluded that unless special methods of instruction are adapted to the needs of the particular group, no positive results occur.[38] Hollingworth listed several advantages and disadvantages to special classes. Advantages ranged from the opportunity to make use of special instructional materials, to the pursuit of special interests, to the wholesome effect of competition from mental equals. The disadvantages included the possibility of developing jealousy in other children, of transporting children greater distances, of expecting too much work, and of allowing children to talk too much.[39]

Twenty-five years ago Wilkins wrote that ability grouping had not "produced the gains in achievement on the part of the superior pupils which were hoped for."[40] At the same time, Cleveland maintained its policy of special classes and relied on the teacher who was given practically unlimited freedom to work out the problem of educating

---

[38]R. R. Cook, "A Study of the Results of Homogeneous Grouping of Abilities in High School Classes," The Education of Gifted Children, Twenty-Third Yearbook of the National Society for the Study of Education, Part I (Bloomington, Illinois: Public School Publishing Company, 1924), p. 312.

[39]Leta S. Hollingworth, Gifted Children: Their Nature and Nurture (New York: Macmillan Co., 1929), p. 300.

[40]Walter L. Wilkins, op. cit., p. 272.

gifted children.[41]

In the past fifteen years the authorities appear to agree that segregation plus special instruction and equipment are successful means of educating the gifted. Briggs wrote that such a plan for students has these advantages:

(a) Careful selection.
(b) Extra motivation because of this selection.
(c) Stimulation from a group of superior students.
(d) High morale in such a class.
(e) Procedures especially suited to abilities and needs.
(f) Use of supplementary readings.[42]

A. D. Thomson summed up the arguments for the special classes in Winnipeg schools as follows:

> Through its Major Work classes, Winnipeg attempts to meet the specific needs of the bright children in its public schools. In setting up the special classes, it was recognized that the bright child masters the essentials of the prescribed program in a shorter period of time than is usually allotted; that he does not require more of the same kind of work to keep him occupied but that he does need additional activities which encourage wholesome mental, physical, and social development; and that he needs challenging work in order to derive satisfaction, to use his potential intellectual powers, and in order that he may develop good study habits. The fast learner needs the association of children of ability equal to his own to challenge him and to make him realize that he has many

---

[41]Prudence T. Lanphear, "What Cleveland is Doing for Superior Pupils," English Journal, XXVI (November, 1937), p. 723.

[42]Leslie J. Briggs, "Intensive Classes for Superior Students," Journal of Educational Psychology, XXXVIII (April, 1947), pp. 207-15.

> peers. He soon learns that there are others brighter than himself. It is hoped that this association will tend towards making him a better student because of the challenging environment, and develop within him a finer character.[43]

Partially segregated programs.-- Strang suggested that "grouping the gifted with their intellectual peers part of the time and in a heterogeneous group the rest of the time, seems the best way to meet their social and intellectual needs."[44] At the high school level the partial segregation has been carried out in some schools by establishing honours classes, although studies show that these have had only qualified success.[45] Maybee advised that junior high students be placed in special classes only in the area of outstanding ability.[46] McWilliams stated that partial segregation programs allowed gifted high school students to

---

[43]Arthur D. Thomson, "Education of the Gifted in Winnipeg," Exceptional Children, XXIV (September, 1957), p. 2.

[44]Ruth Strang, "Psychology of Gifted Children and Youth," Psychology of Exceptional Children, ed. William M. Cruickshank (Edgewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955), p. 515.

[45]Lenoir H. Burnside, "An Experimental Program in the Education of the Intellectually Gifted Adolescent," School Review, L (April, 1942), p. 284.

[46]Gene D. Maybee, "How Can the Junior High School Best Provide for the Academically Talented Students?" Bulletin of the National Association of Secondary-School Principals, XLIII (April, 1959), p. 20.

share "the activities in which he will be associated with people of all levels of ability throughout his life."[47] He agreed that gifted high school students should be placed in ability groups only in those areas where they are able to keep up with the others in the group.[48]

Regular programs.-- Some writers still argue for the retention of gifted children in regular classrooms. Scheifele asserted that the regular classroom provides for the gifted child the normal experiences and interests of childhood.[49] In a study by Baldauf to determine whether an extended and enriched curriculum in regular classrooms contributes more to educational growth than the normal curriculum, it was found that there were no significant differences between the mean achievement test scores in favour of the mentally advanced control groups.[50]

---

[47]Earl M. McWilliams, "The Gifted Pupil in the High School," ibid., XXXIX (May, 1955), p. 5.

[48]Ibid.

[49]Marian Schiefele, The Gifted Child in the Regular Classroom (New York: Bureau of Publications, Teachers College, Columbia University, 1953), p. 49.

[50]Robert J. Baldauf, "A Comparison of the Extent of Educational Growth of Mentally Advanced Pupils in the Cedar Rapids Experiment," Journal of Educational Research, LII (January, 1959), p. 183.

## Special Curricula for the Gifted

Elementary.-- In discussing appropriate curricula, the writers consistently emphasize the need to teach research skills, to require a higher standard of work, to establish broad interests, and to train for creativity and leadership. Norris suggested that the program for gifted children should increase their range of knowledge and skills, and should develop their initiative and creative power. She also recommended that such a program should develop their powers of critical thinking, and provide gifted children with the opportunity to make plans and to judge the results of the execution of those plans.[51]

Specifically, at the elementary level much importance is attached to widening the reading horizons of gifted pupils by means of Reading Clubs,[52] special emphasis on developing worthwhile interests and broadening the background of experience and understanding,[53] and the teaching of research

---

[51]Dorothy E. Norris, "Programs in the Elementary Schools," Education for the Gifted, Fifty-Seventh Yearbook of the National Society for the Study of Education, Part II (Chicago: University of Chicago Press, 1958), p. 225.

[52]Demonstration Research Group, "Methods and Materials for Enrichment in the Fourth and Fifth Grades," Kent State University Bulletin, XLIII (February, 1955), p. 9. (Mimeographed.)

[53]Paul Witty, "Improving the Reading of Gifted Children and Youth," The Packet, VI (February, 1951), p. 10.

skills.[54] Most educators stress the need to present broad concepts in the form of units which will require extensive exploration and provide the background of the development of today's ways of living; for example, Democracy.[55]

Another area of emphasis is creativity. The encouragement and development of this ability through the writing of stories and poems as well as the solving of original problems in arithmetic is suggested by West.[56]

The ability to express oneself orally with fluency, discoursing on a prepared subject, citing worthwhile facts based on the findings of independent research, is a feature stressed by Hall.[57]

A second language introduced at the elementary level seems to be common practice in most programs for the gifted.[58] Special attention to current events is another important feature. The teaching of the skills necessary

---

[54]Jeff West, "Teaching the Talented," Education, LXXVIII (March, 1958), p. 434.

[55]Elsie H. Martens, Curriculum Adjustments for Gifted Children (Washington: U. S. Government Printing Office, 1946), p. 41.

[56]West, op. cit.

[57]Theodore Hall, Gifted Children: The Cleveland Story (New York: World Publishing Co., 1956), p. 44.

[58]Ibid., p. 48.

for reading a newspaper, with the resulting awareness of civic and government affairs and the world, is considered an essential part of the daily program.[59]

High school and college.-- At the high school and college levels, Terman and Oden urged that guidance and counselling procedures be used to prevent the waste of talent. They contended that proper counselling would ensure the right amount and kind of training best adapted for later specialization by brighter students.[60] The Education Policies Commission stated that counselling and guidance are particularly important for gifted children.[61]

This Commission recommended specifically for gifted students at the high school level:

(1) A foreign language in which he attains reading mastery.
(2) Advanced mathematics -- algebra, trigonometry, and calculus.
(3) Additional social studies with special emphasis on history.[62]

---

[59]Audrey Witty, "Enrichment in Ottawa," Gifted Children -- Guides for Tomorrow (Syracuse, New York: Syracuse University, 1956), p. 29. (Mimeographed.)

[60]L. M. Terman and M. H. Oden, "Major Issues in the Education of Gifted Children," Journal of Teacher Education, V (September, 1954), p. 231.

[61]Education Policies Commission, Education of the Gifted (Washington, D.C.: National Education Association of the United States, 1950), p. 63.

[62]Ibid.

Havighurst and others in their survey of the education of the gifted concluded that American high schools tend to groom gifted students for scholarship and college entrance examinations. The obvious drawback is that this type of treatment is based on academic achievement, and such special grouping does not "rescue" the underachieving gifted student.[63]

## Identification and Selection

Screening.-- Strang suggested that teachers can identify the gifted child by observing his skillful use of language, quick insight into relationships, sensitivity to the environment, ready learning, good memory, resourcefulness, imagination, sustained attention, wide range of interests, and exceptional social maturity.[64]

In a ten year study of children in one community, the screening was done at the fourth grade level and the Primary Mental Abilities Test was used to identify children

---

[63]R. J. Havighurst and others, A Survey of the Education of Gifted Children. Supplementary Educational Monograph No. 83 (Chicago: University of Chicago Press, 1955), p. 15.

[64]Ruth Strang, Psychology of Gifted Children and Youth," Psychology of Exceptional Children, ed. William M. Cruickshank (Edgewood Cliffs, New Jersey: Prentice-Hall Inc., 1955), pp. 478-79.

of special intellectual ability. In studying the pupils so selected, it was found that they came from the more privileged schools and from the more privileged families within these schools. Their homes were seldom broken by death or divorce, and the families were most likely long term residents in that community.[65]

Another ten year study of sixth-grade children identified as talented on the basis of the Iowa Tests of Basic Skills showed that these children retained their superiority in high school and college. But it appears significant to note that ninety per cent of these students indicated that their parents had exerted considerable influence on their educational and vocational plans rather than the school.[66]

Achievement tests.-- Conant found that test scores plus school marks together predict success more accurately than either separately. He was primarily concerned that the academically talented should be encouraged to take courses in mathematics, physics, chemistry, and foreign

---

[65]Bowman and others, op. cit., p. 31.

[66]Philip D. Gaffney, A Ten-Year Follow-Up Study of Students Identified as Talented on the Basis of Sixth-Grade Achievement Test Scores. Doctor's thesis. Iowa City: State University of Iowa, 1957. Abstract: Dissertation Abstracts, XVII (December, 1957), p. 2918.

languages, so that selections had to be made from pupils who rate high on both test scores and school marks.[67]

Terman would have liked to place all college students who qualified on the basis of achievement test scores at the graduate level. However, when this suggestion was tested on a synthetic class, it was found that it included only twenty-eight per cent of the actual college seniors, twenty per cent of the juniors, nineteen per cent of the sophomores, and fifteen per cent of the freshmen.[68] This certainly points up the urgent problem of improving the predictive value of present measuring instruments.

Aptitude and intelligence tests.-- When two groups of high school students, a bright group and a dull group, were compared by Pyle and Snadden, it was noted that the various abilities or functions of an individual are not uniform. Some of the members of the dull group could excel some of the members of the bright group. These writers cautioned against reliance on a single

---

[67]J. B. Conant, "Education of the Academically Talented," School and Society, LXXXVI (May 10, 1958), p. 226.

[68]Lewis M. Terman, "The Gifted Student and His Academic Environment," School and Society, XLIX (January 21, 1939), pp. 65-73.

measure of a person's ability, or even the use of the pooled results of different types of measures.[69]

Ivins concurred with this conclusion and suggested that gifted high school students should not be placed in special groups on the basis of measurements only, but that adequate individual guidance must be supplied.[70]

Other factors.-- Paul Witty also warned against depending on intelligence test results entirely. He wrote: "....the importance of capacity is over-emphasized and the significance of drive neglected or underestimated ... the presence of a high IQ is not a guarantee of the presence of drive."[71] In another article he stated: "Drive is a complex factor whose bases evade identification."[72]

Whipple observed that in his gifted high school students, ambition and interest were necessary characteristics for achievement. As an administrator he concluded that

---

[69]W. H. Pyle and G. H. Snadden, "An Experimental Study of Bright and Dull High School Pupils," Journal of Educational Psychology, XX (April, 1929), p. 268.

[70]Wilson Ivins, "How Can the Senior High School Best Provide for the Academically Talented Student?" Bulletin of the National Association of Secondary-School Principals, XLIII (April, 1959), p. 27.

[71]P. A. Witty and H. C. Lehman, "Drive: A Neglected Trait in the Study of the Gifted," Psychological Review, XXXIV (September, 1927), pp. 366, 373.

[72]Paul A. Witty, "Exploitation of the Child of High Intelligence," Educational Method, XV (March, 1936), p. 301.

selection tests are useful indicators but that "they do not reveal the all-important factors of maturity, drive, and sustained interest."[73] He advocated the use of performance criteria and teacher observation when selecting special class students.

Problems in identification and selection.--McClelland pointed out the flaw in trying to predict life success from school and college achievement records. He maintained that the error lies in assuming that school and life require identical abilities or character traits. He further suggested that once a minimal level of intelligence is reached, performance beyond that is uncorrelated with ability, nor does ability play a crucial role in success.[74] He observed that successful groups of students came from professional homes, had more books, and their parents had more post-high school education than those of the unsuccessful students.[75] He advocated that research be done to discover the non-intellectual determinants of achievement with

---

[73]F. Hamilton Whipple, "Memorial High School's Advanced Placement Program," Bulletin of the National Association of Secondary-School Principals, XLII (December, 1958), p. 25.

[74]David C. McClelland, "Issues in the Identification of Talent," Talent and Society, D. C. McClelland and others. (Princeton, New Jersey: D. Van Nostrand Co., Inc., 1958), pp. 9, 12.

[75]Ibid., p. 13

respect to family values, family interaction patterns and motives.[76]

Guilford suggested a method of solving this problem by the use of factors. She stated that the limited amount of information obtained from a single score could be improved by analyzing factors to find more meaningful assessments of the intellect.[77]

Weaknesses in the ability to identify and select gifted students cause concern wherever special programs for gifted pupils are in operation. Placement, or failure to place certain pupils in special classes, can result in disturbed home-school and pupil-school relations.

## Achievement and Underachievement

Although Terman's earlier studies were optimistic about the achievement of his selected group, other writers have studied the discrepancies which are found between expected success based on intelligence test scores and actual success recorded in college. In The Gifted Child Grows Up it is stated that "nearly two-thirds of the high school grades of the girls and more than one-half of the

---

[76] Ibid., p. 25.

[77] Joy P. Guilford, "The Structure of Intellect," Psychological Bulletin, LIII (July, 1956), p. 267.

high school grades of the boys were A's."[78] In The Promise of Youth it is recorded that "...nearly three-fourths of the total marks in high school by gifted girls, and nearly one-half of those earned by gifted boys, are of A grade."[79] However, many writers are concerned with those children who are selected as gifted, but who do not maintain A grades.

Causes of underachievement.-- Conklin used matched groups of students of 130 IQ or above who were successful in high school and students who had failed one or more high school subjects, to test whether there were discoverable significant differences between them to indicate causes of adjustment or maldjustment. She was unable to find any significant differences.[80] On the other hand, Horrall's study of matched groups of college students showed that the low achievers of the gifted group had poorer overall

---

[78]L. M. Terman and M. H. Oden, The Gifted Child Grows Up: Genetic Studies of Genius, Vol. IV (Stanford, California: Stanford University Press, 1947), p. 64.

[79]L. M. Terman and others, The Promise of Youth: Genetic Studies of Genius, Vol. III (Stanford, California: Stanford University Press, 1931), p. 473.

[80]Agnes M. Conklin, "A Study of the Personalities of Gifted Students by Means of a Control Group," American Journal of Orthopsychiatry, I (January, 1931), pp. 178-83.

adjustment and more conflicts.[81] They had more parent-child conflicts, more anxiety, and a lack of emotional responsiveness. She concluded that academic underachievement for brilliant students is "a symptom of deep-seated personality problems."

> Whereas their native endowment seems to have given the brilliant students as a whole group many advantages in personal adjustment, nevertheless the circumstances of their lives, such as being grouped with less able children, being emotionally rejected by their parents, or some other factors, whatever they may be, have handicapped them with a compulsive defence against anxiety, and with an habitual disorganized procedure in thinking.[82]

There have been many attempts made to solve the problem of the discrepancy between predicted success and actual school failure. Generally, these fall into three classes: (a) studies of the differences between achievers and underachievers; (b) studies of the relationship between ability and achievement; and (c) studies of non-intellectual factors affecting achievement.

After weighing the results of the research, Passow decided that there are few significant differences found in the factors which seem to affect the motivation of

---

[81]Bernice M. Horrall, "Academic Performance and Personality Adjustments of Highly Intelligent College Students," Genetic Psychology Monographs, LV (February, 1957), p. 76.

[82]Ibid., P. 77.

talented children with respect to social, ethnic, and economic background, or school and personality.[83] And Goldberg bluntly stated that the cause of underachievement is still a mystery.[84]

Remedies for underachievement.-- Wilhelms noted that although programs of acceleration or enrichment are good for achieving students, underachievers need to be given a concept of self, a knowledge of their own abilities, confidence, opportunities to work at what is significant to them as individuals, freedom to be inventive and to take the consequences, freedom to be creative, and freedom to develop their total persons, not just their minds.[85]

Martinson and Stamatakos declared that underachieving students require personal assistance with their problems in the areas of self-appraisal, study habits, vocational and academic adjustment and personal recognition

---

[83]A. Harry Passow, "Planning for Talented Youth: A Research Project," Educational Leadership, XIII (January, 1956), p. 251.

[84]Miriam L. Goldberg, "Recent Research on the Talented." Teachers College Record, LX (December, 1958), p. 157.

[85]Fred T. Wilhelms, "Gulliver and Other Underachievers," Educational Leadership, XVI (March, 1959), pp. 369-71.

and attention.[86]

Achievement.-- Authorities agree that motivation and drive are the important factors in achievement by gifted children.[87] But they also agree that drive is a factor which has not been adequately identified.[88] As early as 1927 Witty and Lehman wrote that too much emphasis had been placed on capacity and that drive had been neglected.[89]

Ausubel attempted a study of motivation based on prestige. He found that it operated on two levels -- a general level of competitive aspiration determined by personality, and a specific level of competitive aspiration based on ego-involvement. His final conclusion was that development of original genetic endowment is a result of reward, punishment, stimulation, and example in the early years.[90]

---

[86]W. D. Martinson and L. C. Stamatakos, "An Attempt to Motivate Potentially Superior Students," School and Society, LXXXVII (April, 1959), p. 173.

[87]Ruth Strang, "Psychology of Gifted Children and Youth," Psychology of Exceptional Children, ed. William M. Cruickshank (Edgewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955), pp. 486, 504.

[88]Paul A. Witty, "Exploitation of the Child of High Intelligence," Educational Method, XV (March, 1936), p. 301.

[89]Witty and Lehman, op. cit., p. 366.

[90]David P. Ausubel, "Prestige Motivation of Gifted Children," Genetic Psychology Monographs, XLIII (February, 1951), p. 112.

Goodenough and Rynkiewicz examined Stanford Achievement Test scores obtained by gifted children and concluded that their performance on the test was so far above teachers' marks that evidently the majority of these children got much of their education out of school.[91] They pointed out that habits of industry, and neatness, and the strong desire to achieve produces superior school performance, but they added that certain other traits are needed to ensure adult achievement.[92] These are: prudence and forethought, self-confidence, will power and perseverance, and the desire to excel.[93]

## Evaluation of Special Classes for Gifted Students

In New York City, Justman explored the question of whether intellectually gifted pupils are accepted more readily in segregated or non-segregated classes. He used ninety-five pairs of students matched on the bases of school attended, grade, sex, chronological age, mental age, and

---

[91]F. L. Goodenough and L. M. Rynkiewicz, Exceptional Children (New York: Appleton-Century-Crofts, Inc., 1956), p. 76.

[92]Ibid., p. 114.

[93]Ibid., p. 151.

intelligence test scores. Besides Sociometric tests he administered the California Test of Personality: Section I, Self Adjustment, and Section II, Social Adjustment. The results indicated that those who remained in normal progress classrooms were somewhat less acceptable to their classmates than those placed in special groups, but that generally there was little difference in the social adjustments of both groups.[94]

Three dangers are mentioned by Eads in the Encyclopedia of Modern Education. One is the tendency of segregated programs to place undue value on mental achievement and competitive academic activities which can result in emotional stress. Another is the possible development of conceit and intolerance. The third is the danger of producing inferiority feelings when very high intellectual goals are set by the gifted students and encouraged by the school.[95]

Subjective evaluation.-- In 1956 the Bureau of Educational Research for the Board of Education of New York

---

[94]Joseph Justman, "Personal and Social Adjustment of Intellectually Gifted Accelerants and Non-Accelerants in Junior High Schools," School Review, LXI (November, 1953), pp. 468-78.

[95]Laura K. Eads, "Education of Gifted Children," Encyclopedia of Modern Education, ed. Harry N. Rivlin (New York: Philosophical Library of New York City, 1943), p. 336.

City reported the results of a questionnaire which had been sent to one hundred twenty teachers in New York City schools where Intellectually Gifted Classes had been established for five years or more. Criticism by these teachers had four bases. Some teachers rejected the philosophy underlying the formation of such classes. Some felt that these classes were conducive to the development of personal and social maladjustments in the pupils. Others resented the activities of the parents of the children placed in the special classes. Still others contended that the organization of special classes led to undesirable administrative practices.[96]

Taking a broader view, Klein wrote that the best adjustment the truly gifted person can make is "to develop his own talents and to place them at the disposal of the community; and if this requires that he be permitted to travel along paths somewhat different from the rest of his fellows, a wise society will ease the way for him.[97]

---

[96]J. Justman and J. W. Wrightstone, "The Expressed Attitudes of Teachers Toward Special Classes for Intellectually Gifted Children," Educational Administration and Supervision, XLII (March, 1956), pp. 141-48.

[97]Milton M. Klein, "Social Education of the Academically Talented," Bulletin of the National Association of Secondary-School Principals, XLII (September, 1958), p. 25.

Virgil Ward maintained that if there is a definite theory in the planning of educational programs for the gifted, then administrative provisions can be evaluated. He suggested that present practices -- for example, ability grouping, acceleration, and after-school classes -- are unsatisfactory because there has been no theory shaping the special curricula used.[98] He made several recommendations: (1) that the superior student should play a role in the planning of his own education; (2) that the gifted pupil should be introduced to the characteristics of many fields of study rather than be required to learn many facts about a few fields of study; (3) that a greater degree of abstraction be employed in the teaching of the gifted by introducing advanced texts and original sources.[99] Above all, Ward recommended that instruction be in the realm of ideas, and condemned any program which accepts average quality in thought or performance.[100]

In another article, Ward set forth a plan of "Educational Experiences for Superior Students."[101] He

---

[98]Virgil S. Ward, "The Role and Nature of Theory in the Education of the Gifted," Educational Theory, X (July, 1960), p. 211.



[99]Ibid., pp. 213-14.

[100]Ibid., p. 215.

[101]Virgil S. Ward, "Systematic Intensification and Extensification of the School Curriculum," Exceptional Children, XXVII (October, 1960), pp. 61-71, 77.

provided a list of "types of study" which he deemed essential for them:

(1) Perspectives upon knowledge
(2) Functional concepts
(3) Summary analyses
(4) Hidden realities
(5) Significant theses
(6) Great ideas[102]

Ward has pointed up the weaknesses in past attempts to evaluate special programs for the gifted. Without a consistent philosophy and a purposeful curriculum, the programs fluctuate from one emphasis to another with each wind of change in educational circles. As a result, objective evaluation of the various programs has been difficult. However, in view of the fact that the whole idea of special provision for the gifted pupils in the schools has been accepted only recently by many, and is still rejected by some, it is not surprising that this state of affairs should exist.

Objective evaluation.-- Many of the established programs were especially directed toward reducing under-achievement in high ability pupils. In New York City a Talent Preservation Project was undertaken after it was

---

[102] Ibid.

discovered that fifty per cent of the gifted students "were not functioning at expected levels of achievement."[103] A Talented Youth Program was carried on in Evanston, Illinois. These studies tried to discover effective approaches in reducing underachievement, and focused attention on the identified underachievers.

Chambers' findings in her follow-up study of the gifted pupils in St. Louis schools during the 1920's showed that many of these students had been aided by stimulation from outside of the home by some person or community agency, most often the school or library.[104] She also found that the percentage who were dissatisfied and left school early was higher than Cleveland's record where a special program for the gifted was in operation. In a study of gifted accelerants and non-accelerants using approximately seventy-five matched pairs, Justman found that the segregated classes showed superior achievement and that this could be partly

---

[103]M. Krugman and I. Impellizzeri, "Identification and Guidance of Underachieving Gifted Students," Exceptional Children, XXVI (February, 1960), p. 283.

[104]Katherine P. Chambers, A Follow-Up Study of Gifted St. Louis Public School Pupils of the 1920's. Doctor's thesis. St. Louis, Mo.: Washington University, 1956. Abstract: Dissertation Abstracts, XVI (June, 1956), p. 1109.

attributed to their enrolment in the special progress group.[105]

Carlson studied a group of gifted children in a special class and a control group of pupils in regular classrooms in the elementary grades for four years, and concluded that the special class pupils had improved appreciably. The gifted children who had been placed in the special class included those with social and emotional problems. All of the special class pupils showed better progress than the gifted children in regular classes, made better use of their abilities, and "did not succumb to kinds of personality defects which frequently appear in the highly endowed."[106] The junior high school teachers who did not know which pupils had been in the special class or the control group noted that there were differences in work habits, ability to discuss, leadership qualities, and social poise. The parents of the special class pupils noted improvement in self-assurance, social poise, adaptability, sense of responsibility, and development of all-round interests. These children were

---

[105]Joseph Justman, "Academic Achievement of Intellectually Gifted Accelerants and Non-Accelerants in Junior High School," School Review, LXII (March, 1954), p. 150.

[106]Edith Fox Carlson, "Project for Gifted Children: A Psychological Evaluation," American Journal of Orthopsychiatry, XV (October, 1945), p. 660.

found to have a rich fund of general information and a wealth of factual material unknown to the control group of children.[107]

By providing a special program of Honour-Work classes for gifted adolescents, one Rochester, New York, high school concluded that their provisions were not successful in fully raising standards of achievement, but that gains were evident in personality development, poise, stability, and willingness to assume a share in responsibility for themselves and the group.[108]

In Detroit, the Special Advanced Class students, when compared with controls, demonstrated general superiority in English -- oral expression, reading, literature, and written composition. They benefited by training in debating, parliamentary procedure, extemporaneous discussion, dramatization, use of references and indices, writing for school publications, reports, notes, and outlines.[109]

---

[107] Ibid., p. 652.

[108] Lenoir H. Burnside, "An Experimental Program in the Education of the Intellectually Gifted Adolescent," School Review, L (April, 1942), p. 284.

[109] Anna M. Engel, "Comparison of Attainments of Gifted Children in Special Classes with Gifted Children in Ordinary Classes," The Education of Gifted Children. Twenty-Third Yearbook of the National Society for the Study of Education, Part I (Bloomington, Illinois: Public School Publishing Co., 1924), p. 298.

Harms recommended that special guidance be given the superior adolescent to help him meet the problems of development along two main lines -- intellect and will, because the intellectual brightness of some children seems to disappear when adolescence approaches.[110] It may be inferred, then, that a special program for the gifted students would tend to reduce such loss by focusing attention on intellectual pursuits and the value of them.

In evaluating the place which gifted pupils have in terms of school leadership, Finch and Carroll's study determined that in a group of two hundred eleven pupils enrolled in the University High School, University of Minnesota, the leaders tended to be the gifted children.[111]

Horall emphasized the need to place brilliant students in a group so that they will not be handicapped by developing habits of disorganized thinking because they are always with less able individuals. After examining the performances and personalities of brilliant college students, this writer also recommended that these students be placed in special groups even at the university level so that they

---

[110]Ernest Harms, ed. Handbook of Child Guidance (New York: Child Care Publications, 1947), p. 124.

[111]F. H. Finch and H. A. Carroll, "Gifted Children as High School Leaders," Journal of Genetic Psychology, XLI (December, 1932), p. 481.

will be challenged and encouraged to develop their unusual abilities.[112]

Pupil evaluation.-- When gifted pupils were asked by Dressel and Grabow to evaluate their high school experience they complained that regular classes and courses did not stimulate and challenge them. They thought that standards of achievement could and should have been higher. This group appreciated those teachers who had aroused their curiosity, who insisted that work be redone until it was of the highest calibre, and who required students to display initiative and self-reliance.[113]

Those students who had been in the Major Work Program in Cleveland from 1938 to 1952 were questioned by Barbe. Slightly more than eighty-four per cent of those who replied to the questionnaire favoured the special program. Fifty per cent had no suggestions for improving it. The least liked aspects of the program were the attitudes of other students and teachers, and the lack of contact with other pupils. The best liked features were the curriculum differences, the opportunity to express

---

[112]Horrall, op. cit., p. 77.

[113]P. L. Dressel and J. M. Grabow, "The Gifted Evaluate Their High School Experience," Exceptional Children, XXIV (May, 1958), pp. 395-96.

individuality, the freedom from regimentation, and the foreign language study.[114]

## Summary

1. Gifted or talented children are generally considered to be those comprising the top five per cent of the school population.

2. Not all school systems make special provision for gifted students, although special training is becoming more widespread in North America.

3. Several administrative devices are used in current school practice:

(a) Acceleration of up to two years is recommended by some.

(b) Enrichment of the curricula, whether it be in the regular classroom or in partially segregated or wholly segregated programs, is advocated by others.

4. Where special provisions have been made, curricula are being developed to extend and/or intensify the education of the gifted students. There is a growing emphasis on the need to encourage and stimulate creativity,

---

[114]Walter B. Barbe, "Evaluation of Special Classes for Gifted Children," Exceptional Children, XXII (November, 1955), pp. 60-62.

and studies are being carried on to aid in the identification of, and training for, creative thinking.

5. Special programs for the gifted involve a selection program. Screening the school population is usually accomplished by the use of group intelligence tests and questionnaires. A combination of several types of test scores is recommended as a basis for selection. Kinds of tests being used include: achievement, aptitude, and individual intelligence tests. Teacher observation is considered important. The problems involved in predicting future achievement by present tools are being explored so that selection methods may be improved.

6. The seemingly wasted or unused talents of students identified as gifted, but underachieving in school or college, present a constant challenge to researchers. Several approaches to the problem of underachievement have been reported, but to date no study has appeared which positively identifies factors which are significantly different in achievers and underachievers.

7. Another area of study concerns the personal development of the gifted individual. Although many writers agree that individual differences should be encouraged, especially in the realm of creative thinking, still there is concern that the gifted student be helped to make a

satisfactory personal adjustment so that his talents will not be stifled in an effort to conform. Generally, a program of special guidance is recommended to help the gifted pupil develop and use his abilities.

8. Where special provisions for the gifted have been made, some type of evaluation has been attempted.

(a) Subjective evaluations by means of questionnaires have been reported, reflecting teacher and administrator opinion.

(b) Some objective studies made under controlled conditions have attempted to measure the value of segregated and non-segregated classes. Others have endeavoured to pinpoint causes of underachievement. Some have tried to measure the value of special classes in terms of the pupils' academic achievement, leadership abilities, work habits, and social skills.

(c) In some school systems, pupils were asked to evaluate the special program either while they were in it or as graduates.

# CHAPTER III

# DESIGN OF THE EXPERIMENT

## Origin and Definition of the Problem

Origin.-- The provision of special classes for gifted children has been accepted in the School Division of Winnipeg as a means of helping these students to develop their superior abilities. Major Work classes, though highly recommended by a great number of educational leaders, is not yet a widespread practice in North America. This is probably due to several factors. There is a latent distrust of the idea of bestowing extra attention on those who are highly endowed. There are the costs of establishing a special program in terms of: the administration, the testing required for identification and selection, the public relations with the community as a whole and with parents of school age children in particular, the provision of special equipment, the lower pupil-teacher ratio, and the transportation for pupils assigned to distant schools.

An objective evaluation of this special program for the gifted is difficult to achieve. Many of its aims

are in the realm of the development of talents and characteristics for which no suitable measures are available. Some of the successes or failures of the program cannot be measured until these students have completed their training and have taken their places as adults in the community.

One aspect of the program presents itself as appropriate for measurement now. The academic achievement of gifted children who have had Major Work class experience can be examined at the high school level. The Major Work program seeks to train gifted pupils to make the best use of their talents by expanding their thinking through an enriched program from Grade IV to IX, by teaching the research skills, by encouraging independent study, and by establishing efficient work habits. There are other objectives of course, but if these purposes have been achieved, then the gifted individual who has had Major Work experience should be better prepared for academic success in high school than his non-Major Work peers.

The problem situation.-- In order to discover whether Major Work training has better prepared the gifted student for the senior high school program, two groups of pupils were selected for study. One consisted of boys and girls who had been members of Major Work classes from September, 1954, through to the end of their Grade IX

program, and who registered in a Winnipeg senior high school. The matching control group was selected from the Grade IX class lists in the same junior high schools, or neighbouring ones, where the Major Work classes were functioning. These two groups merged upon entering high school. Examining their school achievement as measured by examination marks would disclose whether there were significant differences between these two groups in terms of academic success.

## The Hypotheses

Matching.-- Three null hypotheses were tested in order to determine the effectiveness of the matching of the two groups.

1. There is no significant difference between the mean chronological ages of the Major Work and control groups.

2. There is no significant difference between the mean scores obtained on the Co-operative School and College Ability Tests by the two groups.

3. There is no significant difference between the mean average marks on the grade nine Department of Education tests obtained by the two groups.

Tests of the effects of treatment.-- The null hypotheses used to test achievement and other scores were:

1. There is no significant difference between the mean achievement of the experimental and control groups as indicated by the grade ten Easter examinations in --

(a) Literature
(b) Composition
(c) Geography
(d) Mathematics
(e) Science
(f) French
(g) Average standard scores in the six subjects.

2. There is no significant difference between the mean achievement of the Major Work and control groups as indicated by the grade eleven June examinations in --

(a) Literature
(b) Composition
(c) History
(d) Mathematics
(e) Chemistry
(f) Physics
(g) French
(h) Average standard scores in the seven subjects.

3. There is no significant difference between the mean raw scores on the Watson-Glaser Critical Thinking Appraisal Form AM attained by Major Work and control group members who were in grade eleven in May, 1961.

4. There is no significant difference between the mean raw scores on the Watson-Glaser Critical Thinking

Appraisal Form AM attained by Major Work and control group members who were in grade ten in May, 1961.

5. Discrepancies as great or greater than those shown by the number of times grade eleven classroom teachers attributed qualities of leadership, withdrawal, and aggressiveness on the Behaviour Description Chart to members of the Major Work group and to members of the control group, might have resulted from sampling fluctuations.

6. Discrepancies as great or greater than those shown by the number of times grade ten classroom teachers attributed qualities of leadership, withdrawal, and aggressiveness on the Behaviour Description Chart to members of the Major Work group and to members of the control group, might have resulted from sampling fluctuations.

## Population and Samples

Population.-- According to Wert, Neidt, and Ahmann, in the testing of hypotheses, populations are considered to be infinite and usually hypothetical. When a study is designed to evaluate the effectiveness of a different instructional procedure as compared to the method regularly used, there is no actually existing population taught by the new method. "The hypothetical population consists of an infinite number of similar students, taught under similar

conditions to those prevailing in the sample group evaluated."[1] Thus, the hypothetical population in this study consists of all gifted children who exist, or who have existed, in the Winnipeg school system.

Selection of samples.-- In February, 1954, a survey of gifted children was made in Winnipeg elementary schools at the third and fourth grade levels. All of those children who scored 130 or above on a group intelligence test, or who exhibited superior characteristics, were given individual Stanford-Binet tests by psychologists of the Child Guidance Clinic. Those who scored 130 or over on the revised Stanford-Binet scale were investigated further by interviewing the classroom teachers and the school principals. From the list of recommended pupils, three classes of grades four and five were organized. The parents of these pupils were consulted to gain permission for placement in one of the special classes.

The Major Work class located in the north section of the city, in Machray school, consisted of fourteen grade four, and eleven grade five students. In the central

---

[1] J. E. Wert, C. O. Neidt, and J. S. Ahmann, Statistical Methods in Educational and Psychological Research (New York: Appleton-Century-Crofts, Inc., 1954), p. 126.

section, at Greenway school, there were eight pupils in grade four, and seven pupils in grade five. At Queenston school in the south section of Winnipeg, there were seven pupils in grade four and thirteen pupils in grade five. This made a total of thirty-seven boys and twenty-three girls.

At that time, there were approximately seventeen pupils who had been selected for entrance, but who did not register in the special classes. As far as can be determined most of these pupils either entered Major Work classes at a higher level or were lost to the city school system. Only one pupil was discovered in a grade ten class who had remained in a regular program throughout the elementary and junior high school years, and he became a member of the control group.

## Pupils Involved in the Analysis

The Major Work group.-- From the sixty gifted children enrolled in the first Major Work classes in Winnipeg, a sample was chosen for the study. This sample was composed of the pupils from the original classes who had remained in the special program to the end of grade nine, and who were registered in Winnipeg senior high schools in an academic course. Sixteen boys and seven

girls were enrolled in grade ten in 1959-60; fourteen boys and eight girls registered in grade ten in 1960-61. These thirty boys and fifteen girls in senior high school became the Major Work group.

The control group.-- The regular grade nine class lists of the junior high schools in which Major Work classes were located in 1959 and 1960 were inspected to discover the superior students who had not had special class treatment from the fourth to the ninth grade. Where it was not possible to obtain suitable matching subjects in these junior high schools, the class lists of neighbouring junior high schools were scrutinized. Luxton, Hugh John Macdonald, Isaac Brock, and Sargent Park schools contributed some members to the control group as well as Machray, St. John's, General Wolfe, and River Heights schools.

The controls were matched on the bases of chronological age, sex, junior high school attended, Co-operative School and College Ability Tests scores, and average marks obtained on the Grade IX Department of Education tests in Language, Social Studies, Mathematics, and Science.

Selection was biased in favour of the members of the control group because it was made from the several samples of gifted children in grade nine regular classes who had

become part of the Winnipeg school system after 1954, and who had not been drawn into the segregated program. The Major Work group members were selected from the sample of gifted children who actually were enrolled in Winnipeg schools in the third and fourth grades in 1953-54.

The findings based on these samples are considered to be representative of the population of gifted students in Winnipeg high schools.

## The Major Work Program

Special treatment for the Major Work group was provided in the elementary and junior high schools. Not only is it the purpose of these special classes to encourage the development of latent abilities in superior children, but also to prevent the loss of their potential contribution to society by allowing poor work habits and attitudes to develop in the non-stimulating atmosphere of a classroom where others are not of the same calibre.

The special classes were designed to allow gifted pupils to associate with their peers. This is one means of preventing a gifted child from becoming conceited because of his obvious superiority in a classroom which provides little competition. On the other hand, the underachieving gifted child was placed in the program so that he could develop his

talents in an atmosphere where his efforts would be encouraged and appreciated.

In order to develop special abilities and skills in gifted children, the Major Work program includes a wide variety of experiences in the classroom and through field trips outside the classroom. Acceleration is not attempted. Exploration of the subject fields in breadth and depth is possible because most gifted children are rapid learners and good readers. In addition, conversational French and Typing are included as extra subjects in grades four to six.

It is considered important to allow gifted children to accept responsibility for much of the classroom activity. They learn to organize class meetings using parliamentary procedures, and to chair various types of discussion groups, panels, and debates. They are given the opportunity to organize and publish a class newspaper, which provides many kinds of writing experiences as well.

Because the encouragement of creativity is an important goal in the special program for the gifted, every effort is made to foster this. Many kinds of creative writing experiences -- poetry, prose, plays -- and arts and crafts opportunities are provided.

A regular part of the Major Work program is the presentation of individual reports by the class members

about a topic which they have researched and prepared independently and which is presented orally using brief notes as guides. Illustrative materials to accompany these talks often include charts, maps, coloured slides, and sometimes movies, as well as specimens and models. The class determines the minimum and maximum time limits for these reports, and evaluation afterwards is based on the standards which the pupils themselves have established.

One of the attempts to teach gifted children in the Major Work classes to think critically is made through the Reading Clubs in the elementary classes. Usually the class is divided into two groups. Each group discusses a worthwhile book which has been read by all the members. One or two challenging questions are provided as a starting point for the discussions. These meetings are chaired by each pupil in turn, and the group members are encouraged to carry on the discussion informally. During the Reading Club meetings the pupils make inferences, draw conclusions, and note figures of speech and style. Again, evaluation of the effectiveness of the Reading Club meeting is considered a necessary conclusion to each one.

The teachers for the Major Work classes are chosen on the bases of their academic and professional training and demonstrated ability to organize a classroom flexibly. Often

these teachers have special interests and abilities in the fields of music, art, drama, and science, which enable them to recognize and foster the special talents of their pupils.

## The Treatment Period and Subsequent Program

The treatment period.-- The Major Work group was divided into two parts because the original classes begun in 1954 were combined grades four and five. Thus one section had completed four years in the Major Work program at the end of grade nine and the other section had completed five years in the special program at the end of grade nine.

The subsequent program.-- Upon completion of the ninth grade, the Major Work group was matched with a control group by inspecting the record sheets from all the junior high schools in Winnipeg. A year later, the grade ten records were searched in order to discover those who had enrolled in academic courses in Winnipeg senior high schools. No attempt was made to take into consideration the number of subjects or types of courses these students elected. Some of the senior high schools provide augmented courses with extra options, as well as enriched courses for their gifted students. Some members of the Major Work and control groups were registered in these augmented or enriched courses, while

others were enrolled in a regular program. The individual aptitudes and interests were not considered when the control group was selected.

## Matching

The matching for chronological age, sex, and junior high school attended was straightforward. The chronological age was calculated in months at the time the grade ten April examinations were written, because scores achieved on those tests were used as criteria of high school achievement. The matching for scores on the Co-operative School and College Ability Tests and on marks obtained on the Grade IX Department of Education tests in Language, Social Studies, Science, and Mathematics, was done by careful inspection. The two groups thus obtained were tested. If significant differences in achievement were demonstrated in senior high school, then these differences could be attributed to the different treatments these two groups received prior to grade ten.

Co-operative School and College Ability Tests.-- The Winnipeg School Division uses the Co-operative School and College Ability Tests (SCAT) Form 3A in the grade nine classes. This series of tests is intended to be an aid in

estimating the ability of students to take further schooling. It is not a measure of achievement, but is a standardized series of intelligence tests.[2] The conversion scores were employed as a basis for matching.

The tests were designed to measure two kinds of school-related abilities: verbal and quantitative. There are four parts, each composed of multiple-choice items in which the student must choose the best answer from among five choices. The kinds of items are: Sentence understanding, Numerical computation, Word meanings, and Numerical problem solving. Altogether there are one hundred ten items. Three scores are calculated -- verbal, quantitative, and total.[3] In this study the total scores only were used. According to the authors the scores are reliable measures of an individual's ability.[4]

Grade IX Department of Education tests.-- Each year the provincial Department of Education administers four examinations in academic subjects to all of the grade nine

---

[2]Julian C. Stanley, "Co-operative School and College Ability Tests," The Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (Highland Park, New Jersey: The Gryphon Press, 1959), p. 457.

[3]Co-operative School and College Ability Tests Manual for Interpreting Scores (Princeton, New Jersey: Co-operative Test Division, Educational Testing Service, 1957), p. 5.

[4]Ibid., p. 6.

students in Manitoba. These examinations in Language, Social Studies, Science, and Mathematics, are prepared by committees, each consisting of two school inspectors and two teachers. The papers are marked centrally and the scores based on percentile ranks are returned to the schools. However, for purposes of this study the raw scores were used. The marks in the four subjects were averaged, and the average mark became a basis for matching. Sample copies of the tests administered in June, 1960, are to be found in Appendix B.

## Criterion Tests

The Watson-Glaser Critical Thinking Appraisal.--It has been stated that training in critical thinking is considered an important aspect of the Major Work program for gifted students. In order to investigate whether the members of the Major Work group were more skillful in this area than the members of the control group, the Watson-Glaser Critical Thinking Appraisal Form AM was administered in the schools during May, 1961, by the high school guidance counsellors. The tests were marked by the writer, and the raw scores were used to calculate the *t*-tests. The groups were divided according to grade level for these comparisons because the test was given when some of the students were in grade ten, and some were in grade eleven.

Separate analyses were made according to grade.

Development of tests to measure the ability to think critically has proved difficult. As a result, the measurement cannot be as precise as is desirable. In discussing this aspect of the Watson-Glaser Critical Thinking Appraisal, Hovland says that it "is not yet thoroughly enough standardized to permit the use of scores on it in any absolute way for determining the adequacy of a testee's skill in critical thinking."[5] However, he also states that it is "a promising test for use on an experimental basis for selection purposes and for research on the effects of instructional procedures on critical thinking."[6] It was with this latter purpose in mind that the test was selected as one of the criteria used in this experiment.

The ninety-nine test items are divided under five headings: Inference, Recognition of Assumptions, Deduction, Interpretation, and Evaluation of Arguments. The authors state that the test "is designed to provide problems and situations which require the application of some of the

---

[5]Carl I. Hovland, "The Watson-Glaser Critical Thinking Appraisal," The Fifth Mental Measurements Yearbook, ed. Oscar K. Buros (Highland Park, New Jersey: The Gryphon Press, 1959), p. 797.

[6]Ibid.

important abilities involved in critical thinking."[7] These abilities, they consider, consist of an attitude, a knowledge, and a skill. A critical thinker examines beliefs or proposals in the light of supporting evidence. He is able to recognize the existence (or non-existence) of relationships, and their significance. Then he can weigh the evidence, judge, and evaluate.[8]

Although the test has been rewritten several times in an effort to overcome the weighting of test items due to problems and prejudices affected by geographical location in the United States, nothing has been done specifically for a Canadian population. Therefore it is conceivable that some of the situations contained in the test are not particularly suited to a Canadian high school group. However, the authors point out that "the inclusion of materials from various areas of common prejudice or controversy should generally provide a partial sample of an individual's thinking about issues regarding which he is apt to have personal biases."[9] Since this should be equally true in Canada, it was decided that the Watson-Glaser Critical Thinking Appraisal was the best

---

[7]Goodwin Watson and Edward M. Glaser, Watson-Glaser Critical Thinking Appraisal Manual (Chicago, Illinois: World Book Co., 1952), p. 1.

[8]Ibid., p. 8.

[9]Ibid., p. 2.

test available to measure the critical thinking ability of the high school students in this experiment.

Grade X Easter examinations.-- The scores used to measure academic achievement at the grade ten level were those of the high school Easter examinations. There were two main reasons for this choice. First, the final marks in June were not the same for every student because some were accredited and did not write final examinations. These students were given an average standing based on the year's work, while others received marks obtained on the June finals. Second, the April marks were considered to be a fair indication of grade ten achievement because these tests were given after four-fifths of the school term had been completed. A sample set of grade ten Easter examinations is included in Appendix C.

Z-scores were calculated in order to overcome the difficulties involved in comparing the marks obtained by students in different high schools taking different examinations. This meant that the scores of all of the grade ten students in the six Winnipeg high schools where members of the experimental and control groups were registered in April, 1959, and April, 1960, were used to calculate the sums, the sums of squares, and the means for each of the six subjects: Literature, Composition, Geography,

Mathematics, Science, and French. The first computation was done on a desk calculator. The check was made on the Bendix G-15 computer at the University of Manitoba.

The standard deviations of the scores in each subject were calculated using the formula:

$$s = \sqrt{\frac{N\Sigma X^2 - (\Sigma X)^2}{N(N - 1)}}$$

Then each student's score was standardized to a mean of 50 and a standard deviation of 10 using the formula:

$$Z = 10\left(\frac{X - M}{s}\right) + 50$$

and modified for machine calculation to:

$$Z = \frac{10X}{s} - \left(\frac{10M}{s} - 50\right)$$

After the student's standard scores in each of the six subjects had been obtained, the average standard score was calculated and used as a criterion.

Grade XI June examinations.-- To complete grade eleven, those students who are not accredited, or who are scholarship applicants, write examinations set by the Department of Education. It has been found that the marks awarded by the schools on the basis of the year's work do not differ significantly from those attained on the June examinations.[10]

---

[10]Michael Ewanchuk, "Report of the Education Committee" (report on Bursaries and Scholarships submitted to the University of Manitoba Alumni Association, Winnipeg, Manitoba, October 18, 1961), p. 3. (Mimeographed.)

Samples of 1961 grade eleven Department of Education examination papers are included in Appendix D.

The means and standard deviations for seven subjects were calculated and were used to obtain the Z-scores. The average standard score was also calculated and used as a criterion. The scores thus obtained were considered to be measures of academic achievement in grade eleven.

Behaviour Description Chart.-- One of the goals of the Major Work program is the development of leadership abilities in gifted children by giving them opportunities in the special classes to accept responsibility and to practise the skills involved in the democratic procedures used by leaders in the organization of responsibility at all levels of business and government. Another important aim of the special program is the prevention of the development of poor attitudes in gifted children by placing them in an environment which provides healthy competition, as well as encouragement and appreciation of special abilities.

In searching for a suitable measure to test whether the Major Work group members differed significantly from the control group members with respect to behaviour characteristics, the writer found the Behaviour Description Chart used in the Quincy Youth Development Project in Quincy,

Illinois.[11] The Quincy Project, as part of its ten-year program, selected gifted children at the fourth grade level. Included in this study was a form used by classroom teachers for rating the behaviour of their pupils.

The Behaviour Description Chart consists of ten groups of five items each. In each group there are two items which are presumably typical of average pupils and therefore are not scored. The other three items represent qualities which would typify leadership, withdrawn, or aggressive characteristics. The classroom teachers were asked to indicate the items in each group which were most like and least like the pupil being rated.

In May, 1961, copies of the Behaviour Description Chart were given to the grade ten and eleven teachers in Winnipeg senior high schools who had members of the Major Work and control groups in their classrooms. The rating sheets were scored by the writer following the method used in the Quincy Project. Copies of the rating forms and score sheets are included in Appendix E.

The classroom teachers were most co-operative in

---

[11]Paul H. Bowman and others, Mobilizing Community Resources for Youth: Identification and Treatment of Maladjusted, Delinquent and Gifted Children, Supplementary Educational Monographs, No. 85 (Chicago: University of Chicago Press, 1956), pp. 1-138.

returning the rating sheets. However, the results of ratings by so many different teachers must be viewed with reservations. One positive feature is that many of the Major Work and control group members were in the same classrooms and consequently rated by the same teachers. Unfortunately this is not true of all of them.

## The Design

Test of homogeneity of variance.-- The t-test involves the assumption that there is no significant difference between the variances of the populations from which the samples were drawn.[12] To determine the homogeneity of variances, the ratio between the two estimates of the population variance derived from the samples was calculated.

$$F = \frac{s_2^2}{s_1^2}$$

Test of significance.-- The t-test was used in the study to determine whether the differences between the mean

---

[12]Allen L. Edwards, Statistical Analysis (New York: Rinehart & Co., Inc., 1946), p. 295.

scores obtained by the two groups were large enough so that they could not be attributed to chance factors or sampling variation.

$$t = \frac{M_1 - M_2}{\sqrt{\left(\frac{\Sigma x_1^2 - \Sigma x_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

Chi-square test of teacher rating.-- In the treatment of scores obtained from the teachers' ratings on the Behaviour Description Chart, the chi-square test of significance was employed to determine whether the discrepancies between the number of times leadership, aggressive, and withdrawn qualities were attributed by classroom teachers to members of the Major Work group and to members of the control group, might have resulted from sampling fluctuation.

The formula for chi-square using a four-cell-contingency table was employed.[13]

$$\chi^2 = \frac{N\,(ad - bc)^2}{(a + b)\,(c + d)\,(a + c)\,(b + d)}$$

---

[13] J. E. Wert, C. O. Neidt, and J. S. Ahmann, op. cit., p. 153.

# CHAPTER IV

## STATISTICAL ANALYSIS OF THE DATA

In this chapter the data and analyses are presented for: (1) matching of the Major Work and control groups, (2) academic achievement by both groups on the grade ten Easter examinations, (3) academic achievement by both groups as indicated by grade eleven Department of Education standings, (4) scores on the Watson-Glaser Critical Thinking Appraisal, and (5) scores on the Behaviour Description Chart.

### The Matching of the Major Work and Control Groups

Table 13 in the Appendix shows the matched pairs in the Major Work and control groups who were in grade ten at Easter, 1960.

Table 14 in the Appendix shows the matched pairs in the Major Work and control groups who were in grade ten at Easter, 1961.

The *t*-test for significant differences between groups was applied to determine the effectiveness of matching. As a preliminary to the *t*-tests, all variances were tested and

none was found significant at the one per cent level. (See Appendix, Table 15.)

The null hypothesis, by definition, requires that the difference between the population means is zero. The levels of significant difference are set by convention at five per cent and one per cent. For purposes of this study a difference was declared significant at the five per cent level or less.

The formula:

$$t = \frac{M_1 - M_2}{\sqrt{\left(\frac{\Sigma x_1^2 + \Sigma x_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

was used, where $M_1$ is the Major Work group mean, and $M_2$ is the control group mean. This formula was programmed for the Bendix G-15 computer in order to check the calculations made on a desk calculator.

Chronological age in months.-- The values obtained from the raw data and given in Tables 13 and 14 were substituted into the formula for $t$ above and resulted in a value of .3853 with 88 degrees of freedom.

$$t = \frac{184.889 - 185.356}{\sqrt{\left(\frac{1590 + 1314}{45 + 45 - 2}\right)\left(\frac{1}{45} + \frac{1}{45}\right)}}$$

$t = .3853$

$d.f. = 88$

$P > .70$

The null hypothesis that there is no significant difference between groups in chronological age in months was accepted.

Co-operative School and College Ability Tests.--

For the intelligence test scores the value for $t$ was .1418 with 88 degrees of freedom.

$$t = \frac{308.244 - 308.622}{\sqrt{\left(\frac{4795 + 9263}{45 + 45 - 2}\right)\left(\frac{1}{45} + \frac{1}{45}\right)}}$$

$t = .1418$

$d.f. = 88$

$P > .80$

The null hypothesis that there is no significant difference between groups in intelligence as measured by the Co-operative School and College Ability Tests is accepted.

Grade IX academic achievement.-- Using the average marks obtained on the Grade IX, June, Department of Education tests, the value for t was 1.3997 with 88 degrees of freedom.

$$t = \frac{79.000 - 81.267}{\sqrt{\left(\frac{2234 + 2959}{45 + 45 - 2}\right)\left(\frac{1}{45} + \frac{1}{45}\right)}}$$

$t = 1.3997$

$d.f. = 88$

$P > .20$

The null hypothesis that there is no significant difference between groups in mean achievement on the Grade IX Department of Education tests is accepted.

Summary.-- Table 1 on the following page gives a summary of the statistics related to matching.

## Grade X Academic Achievement

Tables 16 and 17 show the means and standard deviations for scores in six subjects in six Winnipeg high schools for the Easter examinations administered in 1960 and 1961.

TABLE 1

SIGNIFICANCE OF DIFFERENCES IN MEANS
OF MATCHED MAJOR WORK AND CONTROL GROUP STUDENTS
FOR AGE, INTELLIGENCE, AND ACHIEVEMENT TEST AVERAGES

| Test | Major Work | | Control | | t | P | Hyp. |
|---|---|---|---|---|---|---|---|
| | N | M | N | M | | | |
| Chron. Age in Months | 45 | 184.9 | 45 | 185.4 | .3853 | $>.70$ | Accept |
| Intelligence SCAT totals | 45 | 308.2 | 45 | 308.6 | .1418 | $>.80$ | Accept |
| Achievement Grade IX Averages | 45 | 79.0 | 45 | 81.3 | 1.3997 | $>.20$ | Accept |

The formula $Z = \left(\frac{10X - M}{s}\right) + 50$ was used to convert the distribution to a mean of 50 with a standard deviation of 10. Standard scores in six subjects, and the average standard score were calculated for each student. Tables 18, 19, 20 and 21 show the raw scores and Z-scores for Grade X.

Grade X Literature.-- A t-value of 2.4085 was obtained when the formula was applied to the data. With 88 degrees of freedom, the t-value is significant at the 2% level of significance.

$$t = \frac{60.584 - 57.160}{\sqrt{\left(\frac{1848.629 + 2153.048}{45 + 45 - 2}\right)\left(\frac{1}{45} + \frac{1}{45}\right)}}$$

$t = 2.4085$

$d.f. = 88$

$P < .02$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade X Literature is rejected.

Grade X Composition.-- The t-value of .1248 was obtained with 88 degrees of freedom.

$$t = \frac{60.498 - 60.309}{\sqrt{\left(\frac{2330.849 + 2247.706}{45 + 45 - 2}\right)\left(\frac{1}{45} + \frac{1}{45}\right)}}$$

$t = .1243$

$d.f. = 88$

$P > .90$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade X Composition is accepted.

Grade X Geography.-- A t-value of .7811 was obtained with 88 degrees of freedom.

$$t = \frac{59.731 - 58.720}{\sqrt{\left(\frac{1438.746 + 1878.272}{45 + 45 - 2}\right)\left(\frac{1}{45} + \frac{1}{45}\right)}}$$

$t = .7811$

$d.f. = 88$

$P > .40$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade X Geography is accepted.

Grade X Mathematics.-- A t-value of 1.0962 was obtained with 88 degrees of freedom.

$$t = \frac{58.598 - 56.914}{\sqrt{\left(\frac{1773.519 + 2899.262}{45 + 45 - 2}\right)\left(\frac{1}{45} + \frac{1}{45}\right)}}$$

$t = 1.0962$

$d.f. = 88$

$P > .20$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade X Mathematics is accepted.

Grade X Science.-- A t-value of .3035 was obtained with 88 degrees of freedom.

$$t = \frac{59.095 - 58.668}{\sqrt{\left(\frac{1557.189 + 2273.955}{45 + 45 - 2}\right)\left(\frac{1}{45} + \frac{1}{45}\right)}}$$

$t = .3035$

$d.f. = 88$

$P > .70$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade X Science is accepted.

Grade X French.-- A t-value of 2.5244 was found to be significant at the 2% level of significance with 87 degrees of freedom.

$$t = \frac{59.298 - 55.427}{\sqrt{\left(\frac{1516.299 + 3034.808}{44 + 45 - 2}\right)\left(\frac{1}{44} + \frac{1}{45}\right)}}$$

$t = 2.5244$

$d.f. = 87$

$P < .02$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade X French is rejected.

Grade X Z-score averages.-- A t-value of 1.7099 was obtained with 88 degrees of freedom.

$$t = \frac{59.849 - 57.989}{\sqrt{\left(\frac{984.972 + 1357.994}{45 + 45 - 2}\right)\left(\frac{1}{45} + \frac{1}{45}\right)}}$$

$t = 1.7099$

$d.f. = 88$

$P > .05$

The null hypothesis that there is no significant difference between groups in mean average achievement in Grade X is

accepted. However, the value for t closely approaches the 5% level of confidence.

Summary.-- Table 2 provides a summary of t-test results relating to Grade X academic achievement.

## Grade XI Academic Achievement

Table 22 in the Appendix shows the means and standard deviations for the distributions of marks in seven Grade XI subjects for the June, 1961, Department of Education examinations in the Province of Manitoba. Tables 23, 24, 25 and 26 show the raw and Z-scores attained by the students in the Major Work and control groups.

Grade XI Literature.-- A t-value of 2.2168 was found to be significant at the 5% level of significance with 44 degrees of freedom.

$$t = \frac{62.474 - 57.991}{\sqrt{\left(\frac{808.234 + 1261.198}{23 + 23 - 2}\right)\left(\frac{1}{23} + \frac{1}{23}\right)}}$$

$$t = 2.2168$$

$$d.f. = 44$$

$$P < .05$$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade XI Literature is rejected.

TABLE 2

SIGNIFICANCE OF DIFFERENCES IN MEAN Z-SCORES
OF MATCHED MAJOR WORK AND CONTROL GROUP STUDENTS
FOR GRADE X EASTER EXAMINATIONS

| Grade X Subject | Major Work | | Control | | t | P | Hyp. |
|---|---|---|---|---|---|---|---|
| | N | M | N | M | | | |
| Lit. | 45 | 60.6 | 45 | 57.2 | 2.4085 | < .02 | Reject |
| Comp. | 45 | 60.5 | 45 | 60.3 | .1243 | > .90 | Accept |
| Geog. | 45 | 59.7 | 45 | 58.7 | .7811 | > .40 | Accept |
| Math. | 45 | 58.6 | 45 | 56.9 | 1.0962 | > .20 | Accept |
| Science | 45 | 59.1 | 44 | 58.7 | .3035 | > .70 | Accept |
| French | 44 | 59.3 | 45 | 55.4 | 2.5244 | < .02 | Reject |
| Average | 45 | 59.8 | 45 | 58.0 | 1.7099 | > .05 | Accept* |

*Close to 5% level of significance.

Grade XI Composition.-- A t-value of 1.0625 was obtained with 44 degrees of freedom.

$$t = \frac{62.000 - 60.457}{\sqrt{\left(\frac{498.000 + 569.206}{23 + 23 - 2}\right)\left(\frac{1}{23} + \frac{1}{23}\right)}}$$

$t = 1.0625$

$d.f. = 44$

$P > .20$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade XI Composition is accepted.

Grade XI History.-- A t-value of 1.2826 was obtained with 44 degrees of freedom.

$$t = \frac{63.504 - 61.061}{\sqrt{\left(\frac{1177.549 + 658.114}{23 + 23 - 2}\right)\left(\frac{1}{23} + \frac{1}{23}\right)}}$$

$t = 1.2826$

$d.f. = 44$

$P > .20$

The null hypothesis that there is no significant difference in mean achievement between groups in Grade XI History is accepted.

Grade XI Mathematics.-- A t-value of .9957 was obtained with 44 degrees of freedom.

$$t = \frac{59.382 - 56.836}{\sqrt{\left(\frac{1773.233 + 1387.810}{23 + 22 - 2}\right)\left(\frac{1}{23} + \frac{1}{22}\right)}}$$

$t = .9957$

$d.f. = 44$

$P > .40$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade XI Mathematics is accepted.

Grade XI Chemistry.-- A t-value of .3507 was obtained with 43 degrees of freedom.

$$t = \frac{59.444 - 58.873}{\sqrt{\left(\frac{670.876 + 611.043}{23 + 22 - 2}\right)\left(\frac{1}{23} + \frac{1}{22}\right)}}$$

$t = .3507$

$d.f. = 43$

$P > .70$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade XI Chemistry is accepted.

Grade XI Physics.-- A t-value of .2782 was obtained with 35 degrees of freedom.

$$t = \frac{62.932 - 62.383}{\sqrt{\left(\frac{744.711 + 514.755}{19 + 18 - 2}\right)\left(\frac{1}{19} + \frac{1}{18}\right)}}$$

$t = .2782$

$d.f. = 35$

$P > .80$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade XI Physics is accepted.

Grade XI French.-- A t-value of .9733 was obtained with 43 degrees of freedom.

$$t = \frac{61.591 - 59.082}{\sqrt{\left(\frac{1591.758 + 1621.452}{23 + 22 - 2}\right)\left(\frac{1}{23} + \frac{1}{22}\right)}}$$

$t = .9733$

$d.f. = 43$

$P > .30$

The null hypothesis that there is no significant difference between groups in mean achievement in Grade XI French is accepted.

Grade XI Z-score averages.-- A t-value of 1.4767 was obtained with 43 degrees of freedom.

$$t = \frac{61.483 - 59.096}{\sqrt{\left(\frac{590.443 + 672.999}{23 + 22 - 2}\right)\left(\frac{1}{23} + \frac{1}{22}\right)}}$$

$t = 1.4767$

$d.f. = 43$

$P > .20$

The null hypothesis that there is no significant difference between groups in mean average achievement in Grade XI is accepted.

Summary.-- Table 3 provides a summary of t-test results relating to Grade XI academic achievement.

## Watson-Glaser Critical Thinking Appraisal Scores

Table 27 in the Appendix shows the scores obtained by the Grade X and Grade XI students on the Watson-Glaser Critical Thinking Appraisal Form AM in May, 1961. The t-test was again employed to determine whether there were significant differences between groups.

TABLE 3

SIGNIFICANCE OF DIFFERENCES IN MEAN Z-SCORES
OF MATCHED MAJOR WORK AND CONTROL GROUP STUDENTS
FOR GRADE XI DEPARTMENT OF EDUCATION EXAMINATIONS

| Grade XI Subject | Major Work | | Control | | t | P | Hyp. |
|---|---|---|---|---|---|---|---|
| | N | M | N | M | | | |
| Lit. | 23 | 62.5 | 23 | 58.0 | 2.2168 | < .05 | Reject* |
| Comp. | 23 | 62.0 | 23 | 60.5 | 1.0625 | > .20 | Accept |
| History | 23 | 63.5 | 23 | 61.1 | 1.2826 | > .20 | Accept |
| Math. | 23 | 59.4 | 22 | 56.8 | .9957 | > .40 | Accept |
| Chem. | 23 | 59.4 | 22 | 58.9 | .3507 | > .70 | Accept |
| Physics | 19 | 62.9 | 18 | 62.4 | .2782 | > .80 | Accept |
| French | 23 | 61.6 | 22 | 59.1 | .9733 | > .30 | Accept |
| Average | 23 | 61.5 | 22 | 59.1 | 1.4767 | > .20 | Accept |

Grade X pupils.-- A t-value of 1.2325 was obtained with 41 degrees of freedom.

$$t = \frac{68.286 - 70.727}{\sqrt{\left(\frac{622.286 + 1106.364}{21 + 22 - 2}\right)\left(\frac{1}{21} + \frac{1}{22}\right)}}$$

$t = 1.2325$

$d.f. = 41$

$P > .30$

The null hypothesis that there is no significant difference between groups in mean achievement on the Watson-Glaser Critical Thinking Appraisal Form AM is accepted.

Grade XI pupils.-- A t-value of 1.0316 was obtained with 39 degrees of freedom.

$$t = \frac{73.409 - 70.842}{\sqrt{\left(\frac{1591.318 + 870.526}{22 + 19 - 2}\right)\left(\frac{1}{22} + \frac{1}{19}\right)}}$$

$t = 1.0316$

$d.f. = 39$

$P > .40$

The null hypothesis that there is no significant difference between groups in mean achievement on the Watson-Glaser Critical Thinking Appraisal is accepted.

Summary.-- The results of the tests of the hypotheses are summarized in Table 4 below.

TABLE 4

SIGNIFICANCE OF DIFFERENCES IN MEAN SCORES OF MATCHED MAJOR WORK AND CONTROL GROUP STUDENTS ON THE WATSON-GLASER CRITICAL THINKING APPRAISAL FORM AM

| | Major Work | | Control | | t | | P | Hyp. |
|---|---|---|---|---|---|---|---|---|
| | N | M | N | M | | | | |
| Grade X | 21 | 68.3 | 22 | 70.7 | 1.2325 | > | .30 | Accept |
| Grade XI | 22 | 73.4 | 19 | 70.8 | 1.0316 | > | .40 | Accept |

## Behaviour Description Chart Ratings

Table 5 shows scores obtained on leadership, withdrawn, and aggressive items on the Behaviour Description Chart by members of the Major Work and control groups. Separate chi-square tests were calculated for grade ten and grade eleven students on contingency tables for leadership, withdrawal, and aggressiveness.

Grade X scores on leadership.-- Table 6 shows the number of pupils in the Major Work and control groups classified as "average" or "superior". A score greater than 14 was taken as superior, and a score of 14 or less was taken as average. Analysis of the frequencies in this contingency table yielded a chi-square value of .096 with one degree of freedom. This indicated a non-significant difference between the groups on leadership.

Grade X scores on withdrawal.-- Table 7 shows the number of pupils in the Major Work and control groups classified as "more withdrawn" and "less withdrawn". A score of 9 or greater was taken as more withdrawn, and a score of 8 or smaller was taken as less withdrawn. Analysis of the frequencies in this contingency table yielded a chi-square value of .910 with one degree of freedom. This indicated a non-significant difference between the groups on withdrawal.

TABLE 5

BEHAVIOUR DESCRIPTION CHART SCORES

| Pupil | Major Work | | | Control | | |
|---|---|---|---|---|---|---|
| | Leader-ship | With-drawn | Aggres-sive | Leader-ship | With-drawn | Aggres-sive |
| 1 | 12 | 6 | 10 | 9 | 15 | 6 |
| 2 | 20 | 9 | 2 | 12 | 9 | 2 |
| 3 | 15 | 11 | 3 | 10 | 10 | 4 |
| 4 | 17 | 3 | 8 | 11 | 17 | 7 |
| 5 | 18 | 7 | 3 | 10 | 11 | 3 |
| 6 | 10 | 11 | 4 | 10 | 14 | 1 |
| 7 | 13 | 4 | 13 | 14 | 7 | 4 |
| 8 | 9 | 10 | 4 | 14 | 8 | 3 |
| 9 | 13 | 4 | 11 | 12 | 6 | 9 |
| 10 | 12 | 10 | 3 | 9 | 11 | 13 |
| 11 | 12 | 10 | 3 | 11 | 13 | 6 |
| 12 | 15 | 7 | 3 | 16 | 8 | 3 |
| 13 | 17 | 6 | 4 | 12 | 1 | 11 |
| 14 | 10 | 13 | 1 | 13 | 11 | 1 |
| 15 | 13 | 10 | 0 | 12 | 12 | 2 |
| 16 | 17 | 5 | 7 | 11 | 13 | 7 |
| 17 | 14 | 1 | 11 | 12 | 8 | 6 |
| 18 | 14 | 9 | 2 | 10 | 12 | 4 |
| 19 | 14 | 8 | 9 | 15 | 9 | 1 |
| 20 | 16 | 5 | 9 | 14 | 10 | 3 |
| 21 | 12 | 10 | 1 | 15 | 4 | 6 |
| 22 | 13 | 9 | 4 | 15 | 10 | 10 |
| 23 | 14 | 6 | 6 | 16 | 10 | 3 |
| 24 | 14 | 9 | 4 | 13 | 8 | 10 |
| 25 | 11 | 10 | 4 | 19 | 9 | 7 |
| 26 | 15 | 10 | 3 | 14 | 10 | 7 |
| 27 | 14 | 12 | 8 | 15 | 9 | 3 |
| 28 | 18 | 8 | 5 | 13 | 10 | 5 |
| 29 | 18 | 8 | 7 | 15 | 9 | 5 |
| 30 | 11 | 12 | 9 | 18 | 7 | 7 |
| 31 | 7 | 13 | 7 | 18 | 10 | 11 |
| 32 | 16 | 10 | 8 | 18 | 8 | 4 |
| 33 | 14 | 7 | 3 | 10 | 11 | 0 |
| 34 | 10 | 8 | 5 | 16 | 10 | 1 |
| 35 | 20 | 6 | 4 | 10 | 13 | 10 |
| 36 | 11 | 11 | 4 | 15 | 10 | 7 |
| 37 | 11 | 11 | 3 | 10 | 6 | 10 |
| 38 | 12 | 10 | 1 | 11 | 7 | 9 |
| 39 | 15 | 8 | 7 | 12 | 10 | 9 |
| 40 | 12 | 12 | 3 | 12 | 10 | 1 |
| 41 | 14 | 5 | 7 | 15 | 6 | 9 |
| 42 | 12 | 11 | 4 | 11 | 9 | 4 |
| 43 | 6 | 8 | 13 | 12 | 10 | 4 |
| 44 | 15 | 9 | 4 | 10 | 11 | 4 |
| 45 | 17 | 8 | 3 | 14 | 10 | 3 |

TABLE 6

NUMBERS OF GRADE TEN STUDENTS
RATED AS AVERAGE OR SUPERIOR IN LEADERSHIP
ON THE BEHAVIOUR DESCRIPTION CHART

| Leadership | Major Work | Control | Total |
|---|---|---|---|
| Average | 14 | 13 | 27 |
| Superior | 8 | 9 | 17 |
| Total | 22 | 22 | 44 |

$$\chi^2 = \frac{44\ (126-104)^2}{(14+13)\ (8+9)\ (14+8)\ (13+9)}$$

$$= .096$$

$$d.f. = 1$$

$$P > .30$$

TABLE 7

NUMBERS OF GRADE TEN STUDENTS
RATED AS MORE WITHDRAWN OR LESS WITHDRAWN
ON THE BEHAVIOUR DESCRIPTION CHART

| Withdrawn | Major Work | Control | Total |
|---|---|---|---|
| More withdrawn | 13 | 16 | 29 |
| Less withdrawn | 9 | 6 | 15 |
| Total | 22 | 22 | 44 |

$$\chi^2 = \frac{44\ (78-144)^2}{(13+16)\ (9+6)\ (13+9)\ (16+6)}$$

$$= .910$$

d.f. = 1

P $>$ .30

Grade X scores on aggressiveness.-- Table 8 shows the number of pupils in the Major Work and control groups classified as "more aggressive" and "less aggressive". A score of 7 or larger was taken as more aggressive, and a score of 6 or smaller was taken as less aggressive. The chi-square value of .834 with one degree of freedom indicated that there is no significant difference between groups on aggressiveness.

Grade XI scores on leadership.-- Table 9 shows the number of pupils in the Major Work and control groups classified as "average" or "superior". A score greater than 12 was taken as superior, and a score of 12 or less was taken as average. The chi-square value of .965 with one degree of freedom indicated that there is no significant difference between groups on leadership.

Grade XI scores on withdrawal.-- Table 10 shows the number of pupils in the Major Work and control groups classified as "more withdrawn" and "less withdrawn". A score of 9 or greater was taken as more withdrawn, and a score of 8 or smaller was taken as less withdrawn. The chi-square value of 3.185 closely approaches the five per cent level of significance on withdrawal.

TABLE 8

NUMBERS OF GRADE TEN STUDENTS
RATED AS MORE AGGRESSIVE OR LESS AGGRESSIVE
ON THE BEHAVIOUR DESCRIPTION CHART

| Aggressive | Major Work | Control | Total |
|---|---|---|---|
| More aggressive | 8 | 11 | 19 |
| Less aggressive | 14 | 11 | 25 |
| Total | 22 | 22 | 44 |

$$\chi^2 = \frac{44\,(88-154)^2}{(8+11)\,(14+11)\,(8+14)\,(11+11)}$$

$$= .834$$

$$d.f. = 1$$

$$P > .30$$

TABLE 9

NUMBERS OF GRADE ELEVEN STUDENTS
RATED AS AVERAGE OR SUPERIOR IN LEADERSHIP
ON THE BEHAVIOUR DESCRIPTION CHART

| Leadership | Major Work | Control | Total |
|---|---|---|---|
| Average | 15 | 18 | 33 |
| Superior | 8 | 5 | 13 |
| Total | 23 | 23 | 46 |

$$\chi^2 = \frac{46\,(75-144)^2}{(15+18)\,(8+5)\,(15+8)\,(18+5)}$$

$$= .965$$

$$d.f. = 1$$

$$P > .30$$

TABLE 10

NUMBERS OF GRADE ELEVEN STUDENTS
RATED AS MORE WITHDRAWN OR LESS WITHDRAWN
ON BEHAVIOUR DESCRIPTION CHART

| Withdrawn | Major Work | Control | Total |
|---|---|---|---|
| More withdrawn | 10 | 16 | 26 |
| Less withdrawn | 13 | 7 | 20 |
| Total | 23 | 23 | 46 |

$$\chi^2 = \frac{46\ (70-208)^2}{(10+16)\ (13+7)\ (10+13)\ (16+7)}$$

$$= 3.185$$

$$d.f. = 1$$

$$P > .05$$

Grade XI scores on aggressiveness.-- Table 11 shows the number of pupils in the Major Work and control groups classified as "more aggressive" and "less aggressive". A score of 7 or larger was taken as more aggressive, and a score of 6 or smaller was taken as less aggressive. The chi-square value of .411 with one degree of freedom indicated that there is no significant difference between groups on aggressiveness.

Summary.-- Table 12 is a summary of the chi-square values for the Behaviour Description Chart ratings.

TABLE 11

NUMBERS OF GRADE ELEVEN STUDENTS
RATED AS MORE AGGRESSIVE OR LESS AGGRESSIVE
ON THE BEHAVIOUR DESCRIPTION CHART

| Aggressive | Major Work | Control | Total |
|---|---|---|---|
| More aggressive | 8 | 6 | 14 |
| Less aggressive | 15 | 17 | 32 |
| Total | 23 | 23 | 46 |

$$\chi^2 = \frac{46\ (136-80)^2}{(8+6)\ (15+17)\ (8+15)\ (6+17)}$$

$$= .411$$

$$d.f. = 1$$

$$P > .50$$

TABLE 12

SUMMARY OF CHI-SQUARE VALUES FOR
BEHAVIOUR DESCRIPTION CHART RATINGS

| Items | Grade X Pupils | | | Grade XI Pupils | | |
|---|---|---|---|---|---|---|
| | Chi-square | P | Hyp. | Chi-square | P | Hyp. |
| Leadership | .096 | > .30 | Acc. | .965 | > .30 | Acc. |
| Withdrawn | .910 | > .30 | Acc. | 3.185 | > .05 | Acc.* |
| Aggressive | .834 | > .30 | Acc. | .411 | > .50 | Acc. |

*Close to 5% level of significance.

# CHAPTER V

# FINDINGS AND IMPLICATIONS OF THE STUDY

## General Summary

The problem.-- The Winnipeg School Division offers a special program for intellectually gifted students in grades four through nine in the Major Work classes. When students who had been members of this segregated program entered high school along with equally gifted students who had not been members of the program it was proposed to compare the high school performance of the Major Work class students with that of their non-Major Work class peers.

Selection of subjects.-- The Major Work sample group was drawn from the sixty students who were enrolled in grades four and five Major Work classes in September, 1954. At the conclusion of the special program in grade nine, those students who registered in Winnipeg senior high schools for grade ten constituted the Major Work sample.

The control group students were selected by inspecting school records. Students were matched for sex and junior high school attended. The two groups did not differ

significantly with respect to chronological age, intelligence, and academic achievement in grade nine. A total of forty-five pairs of students was used in the study.

The criterion measures.-- The marks obtained on grade ten school examinations at Easter, and on grade eleven Department of Education examinations in June were used to measure academic achievement. All marks were standardized to Z-scores for purposes of comparison.

The Watson-Glaser Critical Thinking Appraisal was administered by the guidance counsellors in the six senior high schools where the students in this study were enrolled.

The Quincy Youth Development Project Behaviour Description Charts were completed by the home room teachers of the students involved in the study.

Collection of data.-- In order to standardize school marks, the means and standard deviations for six core subjects in the six high schools for Easter 1960 and 1961 were used in calculating Z-scores for Major Work and control group students. The means and standard deviations for Department of Education examination marks in seven grade eleven subjects for June, 1961, were also used for similar calculations.

The Watson-Glaser Critical Thinking Appraisal booklets and the Behaviour Description Charts were scored by the writer.

Analyses of the data.-- The significance of the differences between the mean Z-scores attained by the Major Work and control group students was computed by the t-test after first checking for homogeneity of variance with the F test. The t-test was also used to test differences between means of Watson-Glaser Critical Thinking Appraisal scores.

The chi-square test was applied to the ratings made by classroom teachers on the Behaviour Description Chart.

Results.-- Significant differences between the academic achievement of the Major Work group students and that of the control group students, ascertained by the t-test, appeared in grade ten Literature and French and in grade eleven Literature. Only those t-values at the five per cent level of significance or less were accepted as statistically significant. The t-value for grade ten average scores approached this level of significance.

## Findings

(1) There is a significant difference between

intellectually gifted students who have been members of Major Work classes and intellectually gifted students who have not been members of Major Work classes in high school achievement as indicated by examination marks in grade ten Literature, grade eleven Literature, and grade ten French.

(2) There is no significant difference between intellectually gifted students who have been members of Major Work classes and intellectually gifted students who have not been members of Major Work classes in high school achievement as indicated by examination marks in grade ten Composition, Geography, Mathematics, Science, and grade eleven Composition, History, Mathematics, Chemistry, Physics, and French.

(3) The difference between groups of intellectually gifted students who have been members of Major Work classes and intellectually gifted students who have not been members of Major Work classes in overall academic achievement in grade ten as indicated by average standard scores closely approached the five per cent level of statistical significance.

(4) There is no significant difference between

intellectually gifted students who have been members of Major Work classes and intellectually gifted students who have not been members of Major Work classes in the ability to think critically as measured by the Watson-Glaser Critical Thinking Appraisal.

(5) There is no significant difference between the numbers of intellectually gifted students who have been members of Major Work classes and the numbers of intellectually gifted students who have not been members of Major Work classes in various categories of personality traits as rated by classroom teachers on the Behaviour Description Chart. The traits rated were: leadership, withdrawal, and aggressiveness.

## Implications of the Study

The findings of this study suggest that the Major Work program for gifted students has succeeded in partially fulfilling its stated purpose with respect to helping intellectually gifted students make better use of their talents in high school. It is important to note that this has been accomplished during the beginning stages of the Major Work program in Winnipeg and it is reasonable to expect that the special program could be further developed

to increase its effectiveness.

Where special emphasis in the Major Work program has been placed on Literature by means of Reading Clubs, for example, and on French, through early instruction, high school academic achievement in these subjects has been improved even after special treatment had been discontinued.

The fact that there were no significant differences between the ratings on withdrawal and aggressive items on the Behaviour Description Chart obtained by gifted students who have been in Major Work classes and by gifted students who have been in regular classes indicates that membership in segregated classes has not adversely affected the personal development of Major Work class students.

## Conclusions

Academic achievement in high school falls short of measuring the effectiveness of the Major Work program. Such intangible benefits as the opportunity to develop leadership abilities, to carry on independent research, to practise oral skills, to benefit by the stimulation and challenge of associating with a group of intellectually gifted students, do not lend themselves to measurement.

# BIBLIOGRAPHY

# BIBLIOGRAPHY

Abraham, Willard. "A Hundred Gifted Children," Understanding the Child, VI (October, 1957), 116-20.

Ausubel, David P. "Prestige Motivation of Gifted Children," Genetic Psychology Monographs, XLIII (February, 1951), 53-117.

Baldauf, Robert J. "A Comparison of the Extent of Educational Growth of Mentally Advanced Pupils in the Cedar Rapids Experiment," Journal of Educational Research, LII (January, 1959), 181-83.

Barbe, Walter B. "Evaluation of Special Classes for Gifted Children," Exceptional Children, XXII (November, 1955), 60-62.

Barr, Arvil S., Robert A. Davis, and Palmer O. Johnson. Educational Research and Appraisal. Chicago: J. B. Lippincott Company, 1953. 362 pp.

Bowman, Paul H., and others. Mobilizing Community Resources for Youth: Identification and Treatment of Maladjusted, Delinquent, and Gifted Children. Supplementary Educational Monographs, No. 85. Chicago: University of Chicago Press, 1956. 138 pp.

Brown, Marion V. "Teaching an Intellectually Gifted Group," Elementary School Journal, XLIX (March, 1949), 380-88.

Briggs, Leslie J. "Intensive Classes for Superior Students," Journal of Educational Psychology, XXXVIII (April, 1947), 207-15.

Burnside, Lenoir H. "An Experimental Program in the Education of the Intellectually Gifted Adolescent," School Review, L (April, 1942), 274-85.

Buros, Oscar K. (ed.). The Fifth Mental Measurements Yearbook. Highland Park, New Jersey: The Gryphon Press, 1959. Pp. 450-57, 796-99.

Carlson, Edith F. "Problems in Educating the Highly Endowed," Journal of Exceptional Children, XIII (April, 1947), 201-204.

Carlson, Edith F. "Project for Gifted Children: A Psychological Evaluation," American Journal of Orthopsychiatry, XV (October, 1945), 648-61.

Chambers, Katherine P. A Follow-Up Study of Gifted St. Louis Public School Pupils of the 1920's. Doctor's Thesis. St. Louis, Mo.: Washington University, 1956. 255 pp. Abstract: Dissertation Abstracts, XVI (June, 1956), 1109-10.

Cohen, Helen L. "The Program for Gifted Children in New York City," English Journal, XXVI (September, 1937), 548-56.

Conant, James B. "Education of the Academically Talented," School and Society, LXXXVI (May 10, 1958), 225-27.

Conklin, Agnes M. "A Study of the Personalities of Gifted Students by Means of a Control Group," American Journal of Orthopsychiatry, I (January, 1931), 178-83.

Cook, Robert R. "A Study of the Results of Homogeneous Grouping of Abilities in High School Classes," The Education of Gifted Children, pp. 302-12. Twenty-Third Yearbook of the National Society for the Study of Education, Part I. Bloomington, Illinois: Public School Publishing Company, 1924.

Co-operative School and College Ability Tests Manual for Interpreting Scores. Princeton, New Jersey: Co-operative Test Division, Educational Testing Service, 1957.

Cruickshank, William M. (ed.). Psychology of Gifted Children and Youth. Edgewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955. Pp. 475-519.

DeHaan, Robert F., and Robert J. Havighurst. Educating Gifted Children. Chicago: University of Chicago Press, 1957. 276 pp.

Demonstration Research Group. "Methods and Materials for Enrichment in the Fourth and Fifth Grades." Kent, Ohio: Kent State University Bulletin, February, 1955, 38 pp. (Mimeographed.)

Dressel, Paul L., and John M. Grabow. "The Gifted Evaluate Their High School Experience," Exceptional Children, XXIV (May, 1958), 394-96.

Eads, Laura K. "Gifted Children, Education of," Encyclopedia of Modern Education, 334-37. New York: Philosophical Library of New York City, 1943.

Educational Policies Commission. Education of the Gifted. Washington, D.C.: National Education Association of the United States, 1950. 88 pp.

Edwards, Allen L. Statistical Analysis. New York: Rinehart and Company, Inc., 1946. 360 pp.

Engel, Anna M. "Comparison of Attainments of Gifted Children in Special Classes with Gifted Children in Ordinary Classes," The Education of Gifted Children, pp. 297-301. Twenty-Third Yearbook of the National Society for the Study of Education, Part I. Bloomington, Illinois: Public School Publishing Company, 1924.

Ewanchuk, Michael. "Report of the Education Committee." Report on Bursaries and Scholarships submitted to the University of Manitoba Alumni Association, Winnipeg, Manitoba, October 18, 1961. (Mimeographed.)

Finch, Frank H., and Herbert A. Carroll. "Gifted Children as High School Leaders," Journal of Genetic Psychology, XLI (December, 1932), 476-81.

Fliegler, Louis A., and Charles E. Bish. "The Gifted and Talented," Review of Educational Research, XXIX (December, 1959), 408-50.

Gaffney, Philip D. "A Ten-Year Follow-Up Study of Students Identified as Talented on the Basis of Sixth Grade Achievement Test Scores." Doctor's Thesis. Iowa City: State University of Iowa, 1957. 131 pp. Abstract: Dissertation Abstracts, XVII (December, 1957), 2918.

Getzels, Jacob W. "Social Values and Individual Motives: The Dilemma of the Gifted," School Review, LXV (March, 1957), 60-63.

Getzels, Jacob W. Quoted in "Digging the Divergent," Time, LXXIII (June 29, 1959), 32.

Goldberg, Miriam L. "Recent Research on the Talented," Teachers College Record, LX (December, 1958), 150-63.

Good, Carter V. (ed.). Dictionary of Education. New York: McGraw-Hill Book Company, Inc., 1945.

Good, Carter V., Arvil S. Barr, and D. E. Scates. The Methodology of Educational Research. New York: Appleton-Century-Crofts, Inc., 1935. 890 pp.

Goodenough, Florence L., and Lois M. Rynkiewicz. Exceptional Children. New York: Appleton-Century-Crofts, Inc., 1956. Pp. 55-175.

Guilford, Joy P. "The Structure of Intellect," Psychological Bulletin, LIII (July, 1956), 267-93.

Hall, Theodore. Gifted Children: The Cleveland Story. New York: World Publishing Company, 1956. 90 pp.

Harms, Ernest, (ed.). Handbook of Child Guidance. New York: Child Care Publications, 1947. Pp. 112-32.

Havighurst, Robert J., and others. A Survey of the Education of Gifted Children. Supplementary Educational Monographs, No. 83. Chicago: University of Chicago Press, 1955. 114 pp.

Hildreth, Gertrude H. Educating Gifted Children. New York: Harper and Brothers, 1952. 272 pp.

Hollingworth, Leta S. "An Enrichment Curriculum for Rapid Learners at P. S. 500: Speyer School," Teachers College Record, XXXIX (January, 1938), 296-306.

Hollingworth, Leta S. Gifted Children: Their Nature and Nurture. New York: Macmillan Company, 1929. 374 pp.

Horrall, Bernice M. "Academic Performance and Personality Adjustments of Highly Intelligent College Students," Genetic Psychology Monographs, LV (February, 1957), 3-83.

Ivins, Wilson. "How Can the Senior High School Best Provide for the Academically Talented Student?" Bulletin of the National Association of Secondary-School Principals, XLIII (April, 1959), 27-28.

Justman, Joseph. "Personal and Social Adjustment of Intellectually Gifted Accelerants and Non-Accelerants in Junior High Schools," School Review, LXI (November, 1953), 467-78.

Justman, Joseph. "Academic Achievement of Intellectually Gifted Accelerants and Non-Accelerants in Junior High School," School Review, LXII (March, 1954), 142-50.

Justman, Joseph. "Academic Achievement of Intellectually Gifted Accelerants and Non-Accelerants in Senior High School," School Review, LXII (November, 1954), 469-73.

Justman, Joseph, and J. W. Wrightstone. "The Expressed Attitudes of Teachers Toward Special Classes for Intellectually Gifted Children," Educational Administration and Supervision, XLII (March, 1956), 141-48.

Klein, Milton M. "Social Education of the Academically Talented," Bulletin of the National Association of Secondary-School Principals, XLII (September, 1958), 22-27.

Krugman, Morris, and Irene H. Impellizzeri. "Identification and Guidance of Underachieving Gifted Students," Exceptional Children, XXVI (February, 1960), 283-86.

Lanphear, Prudence T. "What Cleveland is Doing for Superior Pupils," English Journal, XXVI (November, 1937), 723-28.

Martens, Elsie H. Curriculum Adjustments for Gifted Children. Washington, D.C.: United States Government Printing Office, 1946. 82 pp.

Martinson, William D., and Louis C. Stamatakos. "An Attempt to Motivate Potentially Superior Students," School and Society, LXXXVII (April, 1959), 173-75.

Maybee, Gene D. "How Can the Junior High School Best Provide for the Academically Talented Student?" Bulletin of the National Association of Secondary-School Principals, XLIII (April, 1959), 19-23.

McClelland, David C., and others. Talent and Society. Princeton, New Jersey: D. Van Nostrand Company, Inc., 1958. 275 pp.

McWilliams, Earl M. "The Gifted Pupil in the High School," Bulletin of the National Association of Secondary-School Principals, XXXIX (May, 1955), 1-9.

Michael, Lloyd S., and others. "Secondary School Programs," Education for the Gifted, pp. 263-315. Fifty-Seventh Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1958.

Newland, T. Ernest. "The Gifted," Review of Educational Research, XXIII (December, 1953), 417-31.

Newland, T. Ernest. "The Mentally Gifted," Review of Educational Research, XI (June, 1941), 277-87.

Norris, Dorothy E. "Programs in the Elementary Schools," Education for the Gifted, pp. 222-62. Fifty-Seventh Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1958.

Passow, A. Harry. "Planning for Talented Youth: A Research Project," Educational Leadership, XIII (January, 1956), 249-54.

Passow, A. Harry. "The Comprehensive High School and Gifted Youth," Teachers College Record, LVIII (December, 1956), 144-52.

Passow, A. Harry, and Abraham Tannenbaum. "How Fare the Talented in Our High Schools?" Bulletin of the National Association of Secondary-School Principals, XXXIX (May, 1955), 10-15.

Peachman, Marguerite C. "Attitudes: Their Significance in Education for the Gifted," Journal of Educational Psychology, XXXIII (March, 1942), 183-98.

Pyle, W. H., and G. H. Snadden. "An Experimental Study of Bright and Dull High School Pupils," Journal of Educational Psychology, XX (April, 1929), 262-69.

Rummel, J. Francis. An Introduction to Research Procedures in Education. New York: Harper and Brothers, 1958. 413 pp.

Scheidemann, Norma V. The Psychology of Exceptional Children, Volume I. Boston: Houghton Mifflin Company, 1931. Pp. 231-67.

Scheifele, Marian. The Gifted Child in the Regular Classroom. New York: Bureau of Publications, Teachers College, Columbia University, 1953. 84 pp.

Strang, Ruth. "Inner World of Gifted Adolescents," Journal of Exceptional Children, XVI (January, 1950), 97-101.

Sumption, Merle R., and others. "Special Education for the Gifted Child," The Education of Exceptional Children, pp. 259-80. Forty-Ninth Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1950.

Taylor, K. W. "Creative Intelligence: Are We Giving It a Chance?" Understanding the Child, XII (June, 1943), 14-16.

Terman, Lewis M. "The Gifted Student and His Academic Environment," School and Society, XLIX (January 21, 1939), 65-73.

Terman, Lewis M., and others. The Promise of Youth: Genetic Studies of Genius, Volume III. Stanford, California: Stanford University Press, 1930.

Terman, Lewis M., and Melita H. Oden. The Gifted Child Grows Up: Genetic Studies of Genius, Volume IV. Stanford, California: Stanford University Press, 1947.

Terman, Lewis M., and Melita H. Oden. "Major Issues in the Education of Gifted Children," Journal of Teacher Education, V (September, 1954), 230-32.

Thom, Douglas A., and Nancy Newell. "Hazards of the High IQ." Mental Hygiene, XXIX (January, 1945), 61-77.

Thomson, Arthur D. "Education of the Gifted in Winnipeg," Exceptional Children, XXIV (September, 1957), 2-5.

Thomson, Arthur D. "The Education of the Gifted in Winnipeg." Study Pamphlets in Canadian Education No. 24. Toronto: Copp Clark Company, 1960. 7 pp.

Trow, W. C. "School Programing for the Intellectually Superior," Education, LXXVIII (March, 1958), 430-33.

Tyler, Leona E. "Studies on Motivation and Identification of Gifted Pupils," Review of Educational Research, XXVII (October, 1957), 391-99.

Ward, Virgil S. "The Role and Nature of Theory in the Education of the Gifted," Educational Theory, X (July, 1960), 210-16.

Ward, Virgil S. "Systematic Intensification and Extensification of the School Curriculum," Exceptional Children, XXVII (October, 1960), 61-71, 77.

Watson, Goodwin, and Edward M. Glaser. Watson-Glaser Critical Thinking Appraisal Manual. Chicago: World Book Company, 1952. 12 pp.

Weir, John R. Quoted in "Exceptionally Exceptional," Time, LXVII (April 2, 1956), 38.

Wert, James E., Charles O. Neidt, and Stanley J. Ahmann. Statistical Methods in Educational and Psychological Research. New York: Appleton-Century-Crofts, Inc., 1954. 435 pp.

West, Jeff. "Teaching the Talented," Education, LXXVIII (March, 1958), 434-38.

Whipple, F. Hamilton. "Memorial High School's Advanced Placement Program," Bulletin of the National Association of Secondary-School Principals, XLII (December, 1958), 24-26.

Wilhelms, Fred T. "Gulliver and Other Underachievers," Educational Leadership, XVI (March, 1959), 369-72.

Wilkins, Walter L. "High School Achievement of Accelerated Pupils," School Review, XLIV (April, 1936), 268-73.

Williams, Clifford W. "Characteristics and Objectives of a Program for the Gifted," Education for the Gifted, pp. 147-65. Fifty-Seventh Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1958.

Winnipeg Free Press, June 24, 1960.

Witty, Audrey. "Enrichment in Ottawa, Gifted Children -- Guides for Tomorrow." Syracuse, New York: Syracuse University, 1956. (Mimeographed.)

Witty, Paul A. "Exploitation of the Child of High Intelligence," Educational Method, XV (March, 1936), 298-304.

Witty, Paul A. "Improving the Reading of Gifted Children and Youth," The Packet, VI (February, 1951), 3-17.

Witty, Paul A. (ed.). The Gifted Child. Boston: D. C. Heath and Company, 1951. 338 pp.

Witty, Paul A., and Samuel W. Bloom. "The Education of the Superior High School Student," Bulletin of the National Association of Secondary-School Principals, XXXIX (January, 1955), 15-22.

Witty, Paul A., and Harvey C. Lehman. "Drive: A Neglected Trait in the Study of the Gifted," Psychological Review, XXXIV (September, 1927), 364-76.

Worcester, D. A. The Education of Children of Above-Average Mentality. Lincoln, Nebraska: University of Nebraska Press, 1955. 58 pp.

Youngert, Eugene. "Is It Desirable to Organize Special Classes for Gifted Students?" Teachers College Record. XXXIX (February, 1938), 375-88.

# APPENDIX A

"REPORT ON MAJOR WORK CLASSES IN WINNIPEG PUBLIC SCHOOLS"

BY THE SUPERINTENDENT'S DEPARTMENT,

SCHOOL DISTRICT OF WINNIPEG NO. 1, NOVEMBER, 1958.

SCHOOL DISTRICT OF WINNIPEG NO. I
Superintendent's Department

November, 1958

## MAJOR WORK CLASSES

### Introduction

In keeping with widespread recognition that equal educational opportunity does not necessarily mean identical educational opportunity, many classes such as slow-learner classes, ungraded classes, physically and visually handicapped classes, and major work classes have been established. The establishment of these classes is an attempt to provide, in part, for individual differences among pupils. Any progress toward this ideal brings with it new problems. Now that more and more children are attending school for longer periods, the range of abilities widens and becomes more apparent. Yet each child is entitled to the best educational opportunity that can be afforded him. The major work classes seek to provide this opportunity for one group of children. They were instituted for those children whose ability makes it difficult to offer them in regular classes a program consonant with that ability, a program designed to challenge and to stimulate them to an extent that cannot be done in regular classes.

### Inception and Growth

The major work program in Winnipeg began with three classes in grades IV and V in September, 1954. Today there are 24 classes in the program: viz,

| | |
|---|---|
| Grade IV | 5 |
| Grade V | 2 |
| Grade V & VI | 5 |
| Grade VI | 1 |
| Grade VII | 5 |
| Grade VIII | 3 |
| Grade IX | 3 |

As the original classes advance through the system and new classes take their place, the total number continues to grow. For example, there are currently 5 classes in grade VII -- these classes will next year move to grade VIII and be replaced by more grade VII's. In addition, increasing enrolments throughout the city may make it desirable to establish other classes. A growing awareness on the part of school personnel of the type of child who belongs in and is likely to derive benefit from membership in the classes may also add to the numbers.

Aim of the Program

In the past some provision has been made for children of superior ability. Grouping of children both by ability and by choice of elective subjects has often resulted in the gathering of pupils of better-than-average ability in teaching groups. Principals and teachers have found ways in which to challenge and develop those pupils of superior abilities. The essential difference is that the major work program is designed to make provision for these children on a more carefully planned basis. Increased knowledge about child development, improved information about how to provide for these children, the

experiences of other educational systems have all been of value in planning the Winnipeg program.

In a continuing effort to meet the problem of providing for individual differences, it is necessary that pupils of superior potential be furnished with ample opportunity to develop their abilities and talents, and to improve their skills. Not only the individuals concerned but also society as a whole will benefit. True, many of these children have achieved success in the past despite the lack of special classes but this success does not remove the responsibility for identifying and promoting the education of as many superior pupils as possible. One of the difficulties in gaining widespread acceptance of the need to make provision for the child of superior potential is the fact that there are many intangibles that cannot be readily evaluated and reduced to objective terms. The value of the additional experiences made available to major work pupils cannot be scored in factual tests. Facts stored in the vault of the mind do not necessarily produce an educated person. Rather educational provision for children of superior ability must create an atmosphere in which creativity, curiosity, initiative and imagination may flourish. The ability to evaluate, to see relationships, to make judgments and to think critically is of a higher order than the acquisition of facts. As improvement in this ability is difficult to achieve, so is it difficult to measure.

The Program

Enrichment is the core of the program. Opportunities are

provided for the able child to probe more deeply, range more widely, and accomplish more than the average child in intellectual, social, and cultural experiences. Special instruction in art, intensive work in language and literature, preparing and presenting reports, reviewing books, studying a foreign language at an early age, and speaking before the class are some of the areas of enrichment. Because brighter children are generally able and assiduous readers and because they delight in books, they are encouraged to broaden their reading interests in the fields of science, history, biography, travel, poetry, and others.

There is no set method of class instruction. Indeed, the method varies in keeping with the activity, with the level of the class, and with the progress of the children. Often the teacher does more directing and guiding than teaching. The ingenious teacher knows there is no best way to teach these children. The program must be flexible and experimental if it is to accomplish its ends: to increase the child's ability to think critically; to advance his love of learning; to improve his skills; to encourage and train his talents.

Selection of Teachers

Because the teacher is the most important factor in the classroom situation, selection must be made carefully. In addition to those qualities of every good teacher such as alertness, friendliness, understanding, and constructive attitude toward the individual, he must have

an appreciation of the special needs of the major work class and should be free from rigid ideas of class organization and operation. The teacher must be willing to initiate and to direct group work, to capitalize on the interests of the children, to use a wide range of resources, and yet to maintain a balanced program so that the grade requirements are well met.

The teachers of major work classes are selected, wherever possible, from those who are university graduates and who have given outstanding service for some years. The Board of Trustees makes bursaries available so that teachers may get special training in methods of teaching gifted children.

Selection of Pupils

Because the program begins in grade IV, a complete survey of grade III pupils is made. The names are reported of all children whose records show an I.Q. of 120 and above on any group or individual intelligence test and of all children who, in the opinion of the principals and teachers, are likely candidates for the program. These children are then given the Primary Mental Abilities Test by the Child Guidance Clinic, and their names are checked against Clinic files for previous individual tests. A detailed report is prepared by the Clinic on those children who continue to score 125 and above. This report is based on interviews with the principal, present teacher, former teacher, and school nurse. These children are grouped as

(a) accepted (b) doubtful (c) not accepted. Those in the doubtful group are then tested individually. Final selection rests with the Supervisor of Special Education. After a child has been selected for placement in a major work class, parental consent is sought by the teacher of the class who visits each family. Sometimes parents are unwilling to allow the child to join the class and, of course, the parental decision is respected.

In addition to the complete survey in grade III, a partial survey is done in grades IV, V, and VI to locate children who may have been missed or who are new to the Winnipeg schools.

Each class serves several schools in its sector of the city. There is no attempt to bring all the children together in one central location. The children are by no means isolated from others in the school but have regular contacts through physical education, music, assemblies, and on the playground. They participate in all school activities and are an integral part of the school. There is no evidence that others consider them or that they consider themselves to be different from other children.

Testing and Evaluation

Despite the difficulties and inconclusiveness of attempts to reduce what are essentially intangibles to objective measurement, a limited evaluation has been carried out. This assessment serves to substantiate what has been the subjective opinion of school personnel

associated in or familiar with the program. The evaluation has taken the following form:

a) Small but representative groups of major work pupils in grades IV, V, and VII were given a series known as the Sequential Tests of Educational Progress (STEP) and a series known as School and College Ability Tests (SCAT).

b) Four classes of major work pupils in grade VI were given the Pybus Test in Social Concepts.

c) All parents of major work pupils were asked to complete a questionnaire.

d) All major work pupils were asked to complete a questionnaire.

The STEP series is designed to measure the educational growth of children in the basic areas of Communication (Reading and Writing), Mathematics, Science, and Social Studies. It purports to measure the more lasting outcomes of learning rather than the mere retention of factual input. The questions are designed to reveal whether the pupils can apply concepts learned in specific subject areas to problems and situations. Thus it is more than an achievement test. The publishers assert that the concepts measured in the tests can hardly be learned without improvement in the skills and understandings of the pupils.

TABLE I

Comparison of Experimental Group and Publisher's Norms -- STEP

| | Reading | Writing¥ | Maths | Science | Social Studies |
|---|---|---|---|---|---|
| | | | a) Grade IV | | |
| Mean - Experimental | 274.00 | 277.95 | 263.15 | 269.85 | 260.62 |
| S.D≠ - Experimental | 12.14 | 13.62 | 8.81 | 7.50 | 7.25 |
| Mean - Publisher | 243.57 | 241.54 | 237.84 | 242.53 | 239.25 |
| S.D≠ - Publisher | 15.43 | 12.23 | 7.51 | 12.57 | 10.17 |

¥ refers to writing ability, not handwriting ≠ S.D. = Standard Deviation

(Table I continued)

| | Reading | Writing* | Maths. | Science | Social Studies |
|---|---|---|---|---|---|
| | | | b) Grade V | | |
| Mean - Experimental | 280.08 | 283.62 | 267.77 | 275.15 | 265.08 |
| S.D/ - Experimental | 13.82 | 16.99 | 5.58 | 10.76 | 8.89 |
| Mean - Publisher | 251.68 | 250.90 | 244.26 | 252.06 | 248.71 |
| S.D/ - Publisher | 16.47 | 16.10 | 10.63 | 13.75 | 11.83 |
| | | | c) Grade VII | | |
| Mean - Experimental | 298.56 | 295.64 | 280.27 | 284.31 | 278.42 |
| S.D/ - Experimental | 6.41 | 11.81 | 5.72 | 9.75 | 7.71 |
| Mean - Publisher | 264.54 | 260.60 | 253.87 | 261.44 | 257.35 |
| S.D/ - Publisher | 18.45 | 16.35 | 12.66 | 11.77 | 12.62 |

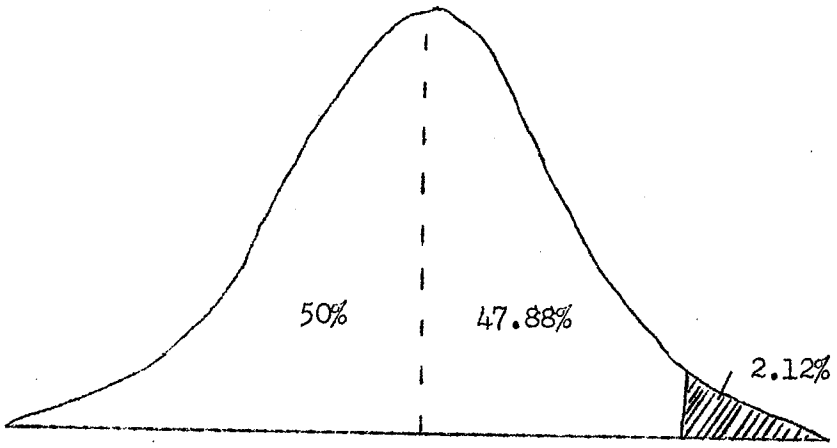
* refers to writing ability, not handwriting
/ S.D. = Standard Deviation

Inspection of Table I reveals that the experimental group did better in all subjects and in all three grades than did the groups of pupils who formed the sample for standardization. The mean score for the Winnipeg pupils is consistently higher than that of the group on whom the norms were computed. The following tabulation shows in terms of percentage where the mean score of the Winnipeg pupils would fall if it were placed on a distribution chart of the norms group; i.e., the Winnipeg mean score is better than the scores of a given percentage of pupils in the norms group.

| | Grade IV | Grade V | Grade VII |
|---|---|---|---|
| Reading | 98.84% | 95.73% | 98.38% |
| Writing | 99.86 | 97.88 | 96.71 |
| Mathematics | 99.96 | 98.64 | 98.17 |
| Science | 98.50 | 95.35 | 97.38 |
| Social Studies | 98.21 | 90.32 | 95.25 |

To illustrate this situation, the comparison of the writing ability of grade V pupils of the publisher's sample and of the experimental group is shown graphically in Figure I.

Figure I




In a normal distribution 50% of the pupils would have scored less than 250.90, 47.88% of the pupils between 250.90 and 283.62.

TABLE II

Comparison of Experimental Group and Publisher's Norms - SCAT

| | Grade IV SCAT 5A | Grade V SCAT 5A | Grade VII SCAT 4A |
|---|---|---|---|
| Mean-Experiemental | 267.15 | 275.23 | 288.76 |
| S.D.-Experimental | 6.46 | 7.32 | 5.85 |
| Mean-Publisher | 247.00# | 253.11# | 264.34# |
| S.D.-Publisher | 4.75# | 6.89# | 10.35# |

# Estimated from publisher's STEP-SCAT correlation samples

From this table it can be seen that the Winnipeg pupils consistently showed a greater ability than did the pupils in the

norms sample. This result is what should have been expected inasmuch as the pupils in the major work classes were carefully selected as being children of superior ability whereas the pupils on whom the test publishers standardized the instrument were carefully selected as representing a typical cross-section of population. On a distribution chart of the norms group, the mean score of Winnipeg pupils would cut off the following percentages:

| Grade IV | Grade V | Grade VII |
|---|---|---|
| 99.9% | 99.9% | 99.1% |

One other revealing comparison follows. The publisher shows where each score on each test falls on the percentile scale. In the STEP series the Winnipeg pupils had the following percentages of test scores at or above the 99th percentile:

| Grade IV | Grade V | Grade VII |
|---|---|---|
| 35.4% | 47.7% | 41.1% |

i.e. 35.4%, 47.7% and 41.1% of Winnipeg major work pupils did as well in their respective grades as did the top 1% of pupils in the norms group.

For the SCAT series the percentages are:

| Grade IV | Grade V | Grade VII |
|---|---|---|
| 84.6% | 76.9% | 56.0% |

The samples of pupils used were sufficiently small that the results must be viewed with caution. Other analyses of the data

are possible but the results obtained tend to support the view that these children do have superior ability and are using it.

One of the aims of the major work program is to improve the pupils' ability to think in abstractions and to encourage the pupils to deal in concepts. Because abstractions, concepts and ideas find their expression in symbols and in language, the understanding of terms, and the use of vocabulary are essential tools in the thinking process. As noted earlier, these children tend to read more widely and more assiduously than their fellows and, of course, in their social studies program, to report upon their findings and to discuss them at greater length and with more depth of understanding. The Pybus Concept Test with norms established for grades VII to XII seeks to determine the extent to which various social concepts were understood by the grade VI major work pupils.

TABLE III

Comparison of Experimental and Norms Groups - Pybus Test

| | Experimental | Gr. IX Norms Group | Gr. X Norms Group |
|---|---|---|---|
| Mean | 54.9 | 49.0 | 58.2 |

This table shows that the major work pupils in grade VI scored better on the Pybus Test of Social Concepts than did the grade IX standardization sample. Although complete data are not available for all secondary grades, the experimental group has a mean score that exceeds the score of a normal grade IX group and is fairly

close to that of the grade X group.

The questionnaires distributed to children and to parents had no place for the name of the child because of the hope that anonymity would induce candor. Parental comment was invited. Many answers were detailed; some were short. The majority of parents strongly favored the major work classes.

The questionnaire and the tabulation of answers to it follow:

SCHOOL DISTRICT OF WINNIPEG No. I
Superintendent's Department

PARENTAL EVALUATION

We are attempting to assess the progress of the boys and girls who have been members of a Major Work Class. Your assistance in evaluating the special program associated with such a class would be appreciated. Would you kindly complete the following questionnaire?

I. We wish to evaluate the growth of the following potential qualities in your child. In our schools we try to provide opportunities for the development of these attributes. It is not expected that the child's rate of progress will be equal in all areas. Perhaps you have noticed some changes in your child since his placement in a Major Work Class. Please indicate your candid opinion by placing a check mark (/) in the appropriate column.

| | Marked Increase | Some Increase | No Change | Decrease |
|---|---|---|---|---|
| A. Habits and Attitudes | | | | |
| Perseverance..... | 64 | 223 | 87 | 4 |
| Initiative ..... | 130 | 206 | 43 | 0 |
| Sense of responsibility | 96 | 173 | 105 | 5 |
| Self-criticism..... | 91 | 149 | 139 | 0 |
| Organization of personal tasks | 68 | 154 | 153 | 4 |
| Enthusiasm for school | 144 | 110 | 106 | 19 |

| | Marked Increase | Some Increase | No Change | Decrease |
|---|---|---|---|---|
| B. Intellectual Development | | | | |
| Intellectual curiosity | 187 | 157 | 35 | 0 |
| Critical thinking..... | 123 | 190 | 67 | 0 |
| Creativity..... | 126 | 158 | 95 | 0 |
| Ability to express ideas | 144 | 190 | 46 | 0 |
| Variety of interests.. | 126 | 194 | 55 | 4 |
| Resourcefulness..... | 87 | 206 | 86 | 0 |
| Imagination..... | 96 | 183 | 100 | 0 |
| More varied reading habits | 158 | 134 | 84 | 0 |
| Time spent reading.... | 170 | 97 | 111 | 0 |

Has your child been moved to a school outside his home district because of Major Work Class placement?

Yes 269 No 108

| II. Friendships | Expanded | Unchanged | Curtailed |
|---|---|---|---|
| As a result of these classes the friendship patterns of your child have been ..... | 170 | 165 | 43 |

III. Adjustments

Rate your child's adjustment since his enrolment in a Major Work Class

| | Improved | Unchanged | Changed but not Deteriorated | Deteriorated |
|---|---|---|---|---|
| A. Adjustment in his home community since joining this class..... | 100 | 214 | 62 | 4 |
| B. Effect of the special placement upon his personal happiness..... | 252 | 81 | 28 | 19 |
| IV. What is the attitude of the community towards you, as parents, since the placement of your child in a Major Work Class? | 5 | 346 | 20 | 5 |

The tabulation of the answers given by the pupils to the second questionnaire follows:

SCHOOL DISTRICT OF WINNIPEG No. I
Superintendent's Department

PUPIL EVALUATION

I. During the past few years you have had many different experiences at school. Rate your enjoyment of these experiences by placing a check mark (✓) in the appropriate column.

| | Very Much | Some | Not very Much | None at all |
|---|---|---|---|---|
| Research experiences | 245 | 157 | 22 | 3 |
| Discussion sessions | 254 | 157 | 17 | 0 |
| Evaluation experiences | 197 | 208 | 11 | 11 |
| Working in groups | 238 | 160 | 22 | 8 |
| Working individually | 209 | 176 | 37 | 6 |
| Planning use of own time | 296 | 101 | 28 | 3 |
| Being a group chairman | 201 | 145 | 56 | 26 |
| Going on trips | 401 | 18 | 7 | 0 |
| French | 172 | 191 | 36 | 28 |

Rate how much benefit you have received from these activities by placing a check mark (✓) in the appropriate column.

| | Very Much | Some | Not very Much | None at all |
|---|---|---|---|---|
| Research experiences | 299 | 116 | 111 | 0 |
| Discussion sessions | 235 | 162 | 28 | 3 |
| Evaluation experiences | 223 | 175 | 28 | 0 |
| Working in groups | 224 | 154 | 48 | 2 |
| Working individually | 274 | 137 | 14 | 3 |
| Planning use of own time | 231 | 141 | 48 | 6 |
| Being a group chairman | 201 | 140 | 51 | 36 |
| Going on trips | 316 | 102 | 7 | 0 |
| French | 210 | 168 | 43 | 7 |

II. By placing a check mark (✓) in the appropriate column, I would rate the quality of my work in these areas as follows:

| | Excellent | Very Good | Good | Fair | Unsatisfactory |
|---|---|---|---|---|---|
| Reading | 117 | 165 | 126 | 17 | 3 |
| Written English | 48 | 134 | 204 | 39 | 3 |
| Oral English | 42 | 168 | 170 | 48 | 0 |
| Arithmetic - Calculation | 73 | 154 | 154 | 39 | 8 |
| Arithmetic - Problems | 71 | 164 | 124 | 51 | 16 |
| Penmanship | 51 | 95 | 138 | 121 | 22 |

III. Where my friends live:

| | Most | Some | A Few | None |
|---|---|---|---|---|
| In my home community | 188 | 124 | 107 | 8 |
| In my class..... | 151 | 210 | 62 | 5 |
| In my school..... | 180 | 134 | 92 | 22 |
| Elsewhere..... | 45 | 104 | 250 | 28 |

IV. How I use my spare time:

| | Most | Some | None |
|---|---|---|---|
| Playing with friends in my community..... | 185 | 232 | 11 |
| Reading..... | 120 | 297 | 11 |
| Radio and T.V. ..... | 88 | 310 | 28 |
| Clubs and group activities | 59 | 268 | 99 |
| Individual hobbies .... | 46 | 290 | 89 |

From an examination of the results of the two questionnaires the program appears to be challenging the pupils. However, despite the positive balance, those teachers and principals in daily touch with the classes need always to be alert to any signs of difficulty in adjusting to the changed circumstance and increased demands of the classes.

Particular attention is drawn to the following:

a) Parental evaluation

1. The changes noted both in habits and attitudes and in intellectual development are markedly favorable.

2. The ratings in friendships, adjustments in the community and in personal happiness are all positive.

3. That there should be any curtailment of friendships and any deterioration in adjustment are matters for concern. The teachers in the program are trying to locate and remedy every problem of this sort.

b) Pupil Evaluation

1. The children profess to find enjoyment in their program. It is noteworthy that they seem to rate the benefit derived higher than the enjoyment.

2. Probably most of the children had never rated their own work critically before. Their agreement that reading was their best developed skill squares with their interest in reading and extensive use of books.

3. The friendship pattern of home community, school, and class suggests that placement in a major work class has not been disturbing.

Summary

The material gathered in this report indicates that the pupils in the major work classes have been able to maintain a high standard of educational progress while participating in a program designed to allow them greater scope in developing their potential strengths. Although the school has accepted the responsibility of providing experiences in aspects of the child's life and development other than the academic, the major task of the public educational system continues to be the development of his intellectual gifts.

That the program needs constant attention and improvement, that evaluating instruments are far from perfect, that some children

are selected for the classes and prove incapable of meeting the demands of the program, that some children of highly able minds may not be discovered and included in the program; these things are recognized and are a matter of continuing concern.

The major work classes are meeting, in part, the need for an augmented program for those children whose superior potential makes the regular program unchallenging. The school is the agency to which society entrusts the formal education of the young, each according to his abilities.

In Winnipeg both those children who have difficulty in coping with the regular program and those children who find it does not offer them sufficient scope are provided for in special classes. Although the ultimate effect of the major work program may never be adequately measured, failure to provide the most favorable conditions for the development of potential strengths may deprive society of outstanding contributions. As Passow well states:"No culture can afford to waste such precious human resources".

# APPENDIX B

## SAMPLE SET OF GRADE IX JUNE EXAMINATIONS

## DEPARTMENT OF EDUCATION

APPENDIX B

Name of Inspector _____

Name of Student _____

School _____

Room Number _____

---

DEPARTMENT OF EDUCATION

Manitoba

---

EXAMINATIONS, JUNE, 1960

GRADE IX LANGUAGE

Thursday, June 23rd, 9.00 to 11.00 a.m.

Examiners: Mrs. E. L. Gowanlock, Mrs. E. A. Howatson

---

The student is required to answer all questions. Punctuation, spelling, penmanship and neatness are essential throughout this paper.

Values
$10 \times \frac{1}{2}$

1. Give the meaning of any FIVE of the following roots. Also give one English word derived from each root chosen.

deus, video, dominus, utilis, aer, pseudos, metron, arche

| | ROOT | MEANING | ENGLISH WORD DERIVED |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |

$9 \times \frac{1}{2}$

2. Underline the word or expression in parenthesis that has a similar meaning to the word given:

| GIVEN WORD | |
|---|---|
| placid: | (perfect, lazy, calm, cautious) |
| ardent: | (eager, hard, talkative, lazy) |
| futile: | (rich, useless, strong, serious) |
| singular: | (musical, dull, unusual, sacred) |
| massive: | (ancient, broken, huge, small) |
| wrest: | (argue, seize, wait, sleep) |
| augment: | (debate, screw, answer, increase) |
| surmount: | (ride, overcome, enter, suspect) |
| ascertain: | (arrange, inquire, find out, forget) |

$20 \times \frac{1}{2}$

3. In the form provided below give the part of speech and use in the sentence of the italicized word. One word is done as an example.

(a) Mary has done the word you gave her.
(b) The boys whom you called have gone to the store.
(c) He fell against the tree because he was very careless.
(d) Judy's patience is a virtue.

| Word | Part of Speech | Use in the Sentence |
|---|---|---|
| Mary | noun | Subject of verb "has done" |
| her | | |
| whom | | |
| have gone | | |
| against | | |
| because | | |
| very | | |
| careless | | |
| Judy's | | |
| a | | |
| virtue | | |

18 x $\frac{1}{2}$ 4. Rewrite the following, placing capitals, indentations and punctuation marks where required:

The four looked up suddenly with a little start what said Quinny abruptly you you were there i was there

$11\frac{1}{2}$ 5. Select all the clauses in the sentences below, and write them in the form provided. If the clause is subordinate, give its kind and relation. You may use diagrams if you wish.

(a) The place where the accident happened is ten miles from here.
(b) That he has succeeded has surprised everyone.
(c) Whenever he is late he tells me that he overslept.
(d) The flowers preach to us if we will hear.

| Clause | Kind | Relation |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

12 x ½ 6. From the following sentences select TWELVE examples as directed below. Place your selection in the space provided.

(a) The parcels which I left in the store were stolen.
(b) The man, having finished his work, went for supper.
(c) The old house standing on the corner is in need of repair.
(d) We have beheld the Mississippi, that mighty river.
(e) The best student is Mary.
(f) You will be rewarded for studying mathematics.

(1) A noun in apposition _____
(2) A predicate nominative _____
(3) A participial phrase _____
(4) A verb in the present perfect tense _____
(5) A noun object of a gerund _____
(6) A relative pronoun _____
(7) A pronoun in the possessive case _____
(8) A superlative degree _____
(9) An auxiliary verb _____
(10) An antecedent of a relative pronoun _____
(11) A verb in the future tense _____
(12) A perfect participle _____

12 x ½ 7. Rewrite the sentences given below correctly. Give the reason for the correction in each case.

(1) Reading the detective story, the time passed rapidly.
CORRECT SENTENCE: _____
Reason: _____

(2) The men started to slowly climb the pole.
CORRECT SENTENCE: _____
Reason: _____

(3) We put the good china after we had fed the guests, into the cupboard.
CORRECT SENTENCE: _____
Reason: _____

(4) Mother laid down for a rest.
CORRECT SENTENCE: _____
Reason: _____

(5) I am looking forward to him visiting us in the future.

CORRECT SENTENCE: _____

Reason: _____

(6) I didn't hear nothing about Ivan lately.

CORRECT SENTENCE: _____

Reason: _____

12 x $\frac{1}{2}$ 8. Write a sentence illustrating each of the following grammatical forms. Use the space provided and underline your example.

(1) An infinitive as subject of a sentence.

(2) A possessive pronoun.

(3) A gerund as object of a verb.

(4) An adjective phrase.

(5) An abstract noun.

(6) An infinitive used as an adjective.

4 x $1\frac{1}{2}$ 9. Select the prepositional phrases in the following sentence giving the kind and relation of each phrase.

A traveller walking over a stretch of wet, swampy land is chilled by the cold, raw wind blowing over the meadow.

| Phrase | Kind | Relation |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

10. Write a letter to the Brown Travel Agency, 55 Bay Street, Calgary, Alberta, requesting information concerning vacation trips to Mexico.

11. Write a carefully worded descriptive paragraph of five or six sentences on one of the following:

An Old House
A Camp Fire
An Angry Man
The River in Spring

12. Write a composition of at least three-quarters of a page on one of the following topics:

| | |
|---|---|
| Dad's Surprise | While Mother Was Away |
| A Birthday Party | Living in a Tent |
| A Book I Enjoyed | A Bad Mistake |

Name of Inspector _____

Name of Student _____

School _____

Room Number _____

DEPARTMENT OF EDUCATION

Manitoba

EXAMINATIONS, JUNE, 1960

GRADE IX

SOCIAL STUDIES

Wednesday, June 22nd, 9.00 to 11.00 a.m.

Examiners: G. M. Morrison, Miss M. H. Speers.

PART A

Values

$12 \times \frac{1}{2} = 6$ 1. At the left is a column divided into sections representing intervals of time and on the right is a list of numbered events. Put the numbers of the events in the right time divisions. Do any 12. No. 12 is done for you to serve as an example.

Time Divisions

| | | |
|---|---|---|
| 1400 | | 1. Commodore Perry visits Japan. |
| 1500 | | 2. Formation of the Weimar Republic. |
| | | 3. Spain loses her Colonial Empire. |
| 1500 | | 4. Formation of the Republic of |
| 1600 | | Indonesia. |
| | | 5. Shifting of trade from Mediter- |
| 1600 | | ranean to Atlantic. |
| 1700 | | 6. Dutch gain their independence of |
| | | Spain. |
| 1700 | | 7. Fall of Napoleon III. |
| 1800 | | 8. Final defeat of Moors by Spain. |
| | | 9. Catherine the Great gains an opening |
| 1800 | 12 | to the Black Sea. |
| 1850 | | 10. Rome becomes the capital of a |
| | | United Italy. |
| 1850 | | 11. Frederick the Great shares in the |
| 1900 | | partition of Poland. |
| | | 12. Napoleon is exiled to St. Helena. |
| 1900 | | 13. Frederick William becomes absolute |
| 1960 | | ruler of Brandenburg-Prussia. |
| | | 14. Martin Luther translates the Bible |
| | | into German. |
| | | 15. The Russo-Japanese War. |

$14 \times \frac{1}{2} = 7$ 2. In the blank spaces at the right below, supply the right word or words to complete any 14 of the following statements:

(1) France's most famous sculptor was _____
(2) Belgium's one colony is _____
(3) The river most famous in the history of Germany is _____
(4) The Scandinavian country most noted for agriculture is _____
(5) The first Communist dictator of Russia was _____

(6) On trial at Rouen in 1431 was _____
(7) Founder of the University of Leyden was _____
(8) Author of Don Quixote was _____
(9) The general term often applied to a country situated between two much stronger rival powers is _____
(10) The country which controls the Strait of the Dardanelles is _____
(11) The author of War and Peace is _____
(12) The President and strong man of France at present is _____
(13) Crowned in Notre Dame Cathedral, Paris, 1804 _____
(14) Painted "Syndics of the Drapers' Guild" _____
(15) Suffered defeat at the Battle of Tours _____
(16) The Unification of the Italian States was begun by the Kingdom of _____

$22x\frac{1}{2}=11$

3. Put the letter of the right answer in the space at the right.

Example: The capital of Hungary is: A. Bucharest, B. Budapest, C. Belgrade, D. Sofia B

(1) Wheat is an important product of: A. Denmark, B. Norway, C. Italy, D. Holland _____
(2) The ruler who did most to improve the lot of the peasant was: A. Alexander II, B. Nicholas II, C. Ivan IV, D. Catherine I. _____
(3) The immediate cause of World War II was the: A. invasion of Finland, B. invasion of Poland, C. murder of the Austrian Archduke, D. taking over of Czechoslovakia. _____
(4) The government of Frederick the Great may be described as: A. Republic, B. Constitutional Monarchy, C. Divine Right Rule, D. Enlightened Despotism. _____
(5) Great aqueducts were built in Spain and France by the: A. Vikings, B. Carthagenians, C. Huns, D. Romans. _____
(6) The deeds of Siegfried and other legendary German heroes are celebrated in the music of: A. Handel, B. Bach, C. Beethoven, D. Wagner _____

(7) The one in the following not a Romance language is: A. Italian, B. French, C. Flemish, D. Spanish. _____

(8) The Crimean War helped to stop the ambitious plans of: A. Russia, B. Turkey, C. Sardinia, D. France. _____

(9) The French Third Republic was formed as the result of the: A. wars of Louis XIV, B. mistakes of Louis XVI, C. Congress of Vienna, D. wars of Napoleon III. _____

(10) The greatest inland water highway of China is the: A. Hwang Ho, B. Yangste, C. Si Kiang, D. Amur. _____

(11) A country having no great literature of its own production is: A. Russia, B. Japan, C. Italy, D. Spain. _____

(12) Intense and growing nationalism has recently been a feature of government policy in: A. Norway, B. Italy, C. Egypt, D. Britain. _____

(13) The opera "Faust" was composed by: A. Gounod, B. Goethe, C. Schubert, D. Mozart. _____

(14) The dominating figure of the Congress of Vienna was: A. Bismarck, B. Louis XIV, C. Metternich, D. Wilson. _____

(15) The leader who stopped the Moor invasion of France was: A. Charlemagne, B. Joan of Arc, C. Hugh Capet, D. Charles Martel. _____

(16) A country whose climate is greatly affected by the Gulf Stream is: A. Spain, B. Norway, C. Japan, D. Italy. _____

(17) The author of "The Prince" was: A. Metternich, B. Karl Marx, C. Mazzini, D. Machiavelli. _____

(18) A buffer state created after World War I was: A. Czechoslovakia, B. Turkey, C. Hungary, D. Roumania. _____

(19) The "Open-Door" policy was proposed by and insisted on by: A. Germany, B. Britain, C. Russia, D. United States. _____

(20) The Black Forest is found in: A. France, B. Sweden, C. Russia, D. Germany. _____

(21) The German philosopher who called Christianity a weak doctrine was: A. Erasmus, B. Spinoza, C. Nietzsche, D. Kant. _____

(22) The German composer who composed "The Magic Flute" and "The Reguiem" was: A. Mozart, B. Handel, C. Schiller, D. Mendelssohn. _____

Values
4x1
=4

4. Put an "X" on the space before the part that would most correctly complete each of the following statements:

(1) Voltaire contributed to the causes of the French Revolution by

____taxing the people heavily.
____spreading revolutionary ideas.
____taking an active part in the Estates General.
____leading armed revolt.

(2) Spain developed coastwise shipping as her chief means of transportation because

____the Spanish were always a seafaring people.
____land travel was difficult.
____all of Spain is close to the sea.
____Spain has many navigable rivers flowing out to sea.

(3) Spain lost her colonies in the New World because

____she was so rich herself she had no need of colonies.
____the English took them from her.
____she wanted to get as much wealth out of the colonies as possible.
____she felt that the colonies would be better off independent.

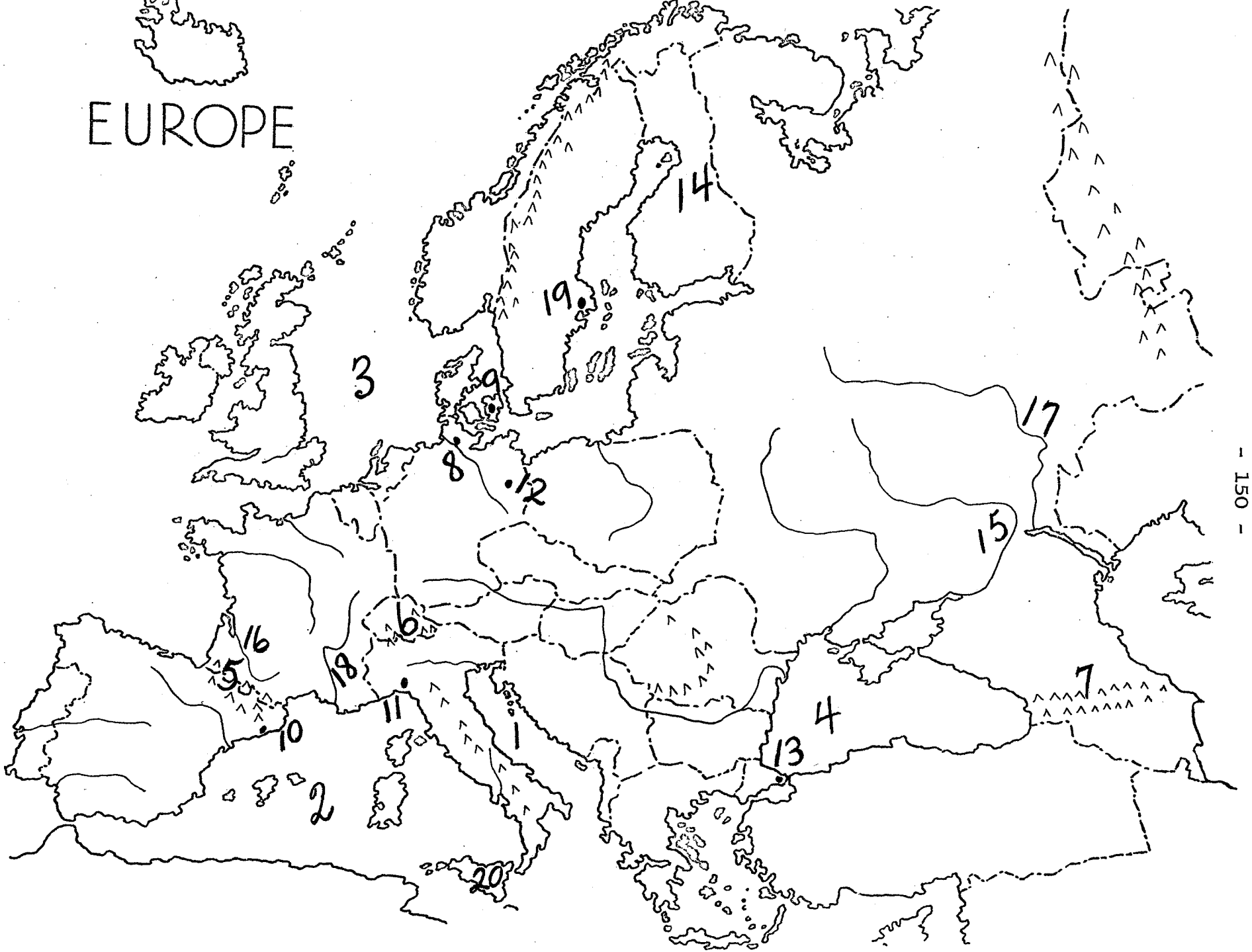
(4) After Japan was opened to American trade and influence

____Japan adopted a democratic government similar to America's.
____the Emperor was restored to power.
____the shotguns became more powerful.
____the government remained the same in form as before.

$20 \times \frac{1}{2}$
=10

5. (a) Opposite the numbers listed write the name of the geographic feature indicated by each number on the accompanying map of Europe:

| | | | |
|---|---|---|---|
| (1) body of water | _____ | (6) mountains | _____ |
| (2) body of water | _____ | (7) mountains | _____ |
| (3) body of water | _____ | (8) city | _____ |
| (4) body of water | _____ | (9) city | _____ |
| (5) mountains | _____ | (10) city | _____ |


EUROPE
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

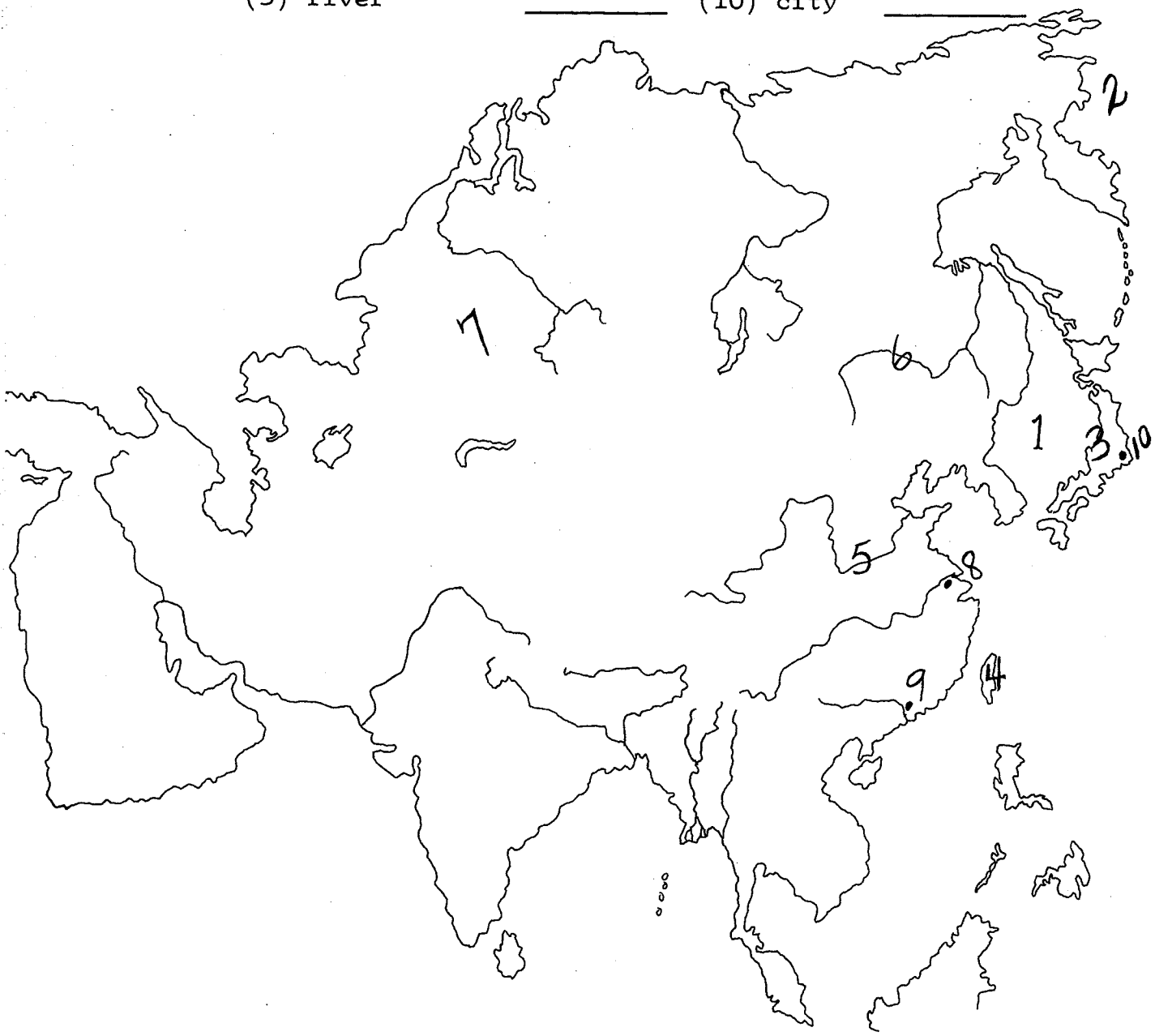
Values

(11) city _____
(12) city _____
(13) city _____
(14) country _____
(15) river _____
(16) river _____
(17) river _____
(18) river _____
(19) city _____
(20) island _____

$10 \times \frac{1}{2} = 5$

5. (b) Opposite the numbers listed, write the name of the geographic feature indicated by each number on the accompanying map of Asia:

(1) body of water _____
(2) body of water _____
(3) island _____
(4) island _____
(5) river _____
(6) river _____
(7) country _____
(8) city _____
(9) city _____
(10) city _____



Values

## PART B

3x2=6 1. Give the meaning and briefly indicate the historical significance of any THREE of the following: (e.g., Bushido: A code that regulated the life of the professional warrior class, or Samurai, in Japanese feudal times.)

(a) collective farm
(b) Estates General
(c) Spanish Inquisition
(d) bandeirantes
(e) Pampas
(f) Shinto

3x5=15 2. MINOR ESSAYS. Students will attempt any THREE of the following topics:

(a) List and discuss briefly the reforms made by Tsar Alexander II.
(b) Describe how Japan was forced by the United States to open her ports to America.
(c) Write an account of Dutch exploration and colonization in the 17th century.
(d) Tell how Hitler rose to power.
(e) Tell how the age of Louis XIV was a time of greatness for France.

## PART C

ESSAY QUESTIONS. Students will write on THREE topics only. These will be:

12 SECTION A. (Do only ONE question from this section.)

1. Describe some features of the French Revolution using the following headings as guides:
   (a) Some unpopular policies of the later French kings (apart from taxation).
   (b) Taxation as it affected the different classes of society.
   (c) Events of the year 1789 leading directly to the Revolution.

2. Give an account of Fascism in Italy, using the following headings as guides:
   (a) Conditions favouring Mussolini's rise to power.
   (b) Conditions in Italy under Fascist rule up to the outbreak of World War II.
   (c) Italy's relations with Ethiopia, Spain, and Germany under the Fascists.

Values

3. Discuss the culture of <u>either</u> the Low Countries <u>or</u> Germany under the following headings:
   (a) Art
   (b) Music
   (c) Literature and Philosophy
   (d) Science

12 SECTION B. (Do only ONE question from this section.)

1. Describe the <u>Career of Bismarck</u> using the following headings as guides:
   (a) His background, political convictions, and methods.
   (b) His aims for Germany and for Prussia.
   (c) His wars and how they helped in the realization of his aims.

2. Discuss the Russian Revolution under the following headings:
   (a) Conditions in Russia before 1917 which were underlying causes of the Revolution.
   (b) Conditions in 1917 furnishing the immediate causes for revolution.
   (c) The Communist seizure of power and the early Communist leaders.

3. Describe Spain's rise to power by considering the the effect of each of the following:
   (a) The rise of Castile.
   (b) The marriage of Ferdinand and Isabella.
   (c) the New World discoveries.

12 SECTION C. (Do only ONE question from this section)

1. Write on Japan's Military Policy in the Nineteenth and Twentieth Centuries using the following headings as guides:
   (a) How the education of the Japanese favoured warlike ideas.
   (b) Circumstances under which Japan acquired each of the following: Formosa, Korea, the German possessions in the far East, Manchuria.
   (c) Japan's military policy in the years 1937-1945 and the final outcome.

2. Discuss Argentina under the following headings:
   (a) Gaining independence and adopting a system of government.
   (b) Sarmiento.

(c) Relations between Argentina and the United States.

3. Brazil has been called a one product country. Explain what is meant by this. Show how this has influenced the development of Brazil. Discuss briefly the future of Brazil in the light of her present population, climate, and natural resources.

4. Compare North and South China under the following headings:
   (a) Climate, soil, and crops grown.
   (b) Terrain and rivers.
   (c) Industries prior to Communism.

Name of Inspector _____

Name of Student _____

School _____

Room Number _____

DEPARTMENT OF EDUCATION

Manitoba

EXAMINATIONS, JUNE, 1960

GRADE IX SCIENCE

Tuesday, June 21st, 9.00 to 11.00 a.m.

Examiners: L. B. Clarke, A. K. Stratton

PART I. Complete each statement by adding a word or words in the blank spaces.
(one mark for each correct answer)

1. Usually hatcheries release young fish into lakes at the stage called _____

2. One common cause of erosion of pasture land is the practice of _____

3. A herbivorous animal which becomes the food of furbearers in Arctic regions is the _____

4. Another name for the leaf stalk is _____

5. The sugary sap that feeds the whole plant is made in the leaves by the process of _____

6. The only substance that can change non-living food into living materials is _____

7. In hay infusion, decay bacteria become the food of flagellates which in turn are devoured by larger protozoans called _____

8. When liquid food passes through its surrounding membrane into a living cell the process is called _____

9. One very dangerous type of food poisoning is called _____

10. Plants that are in the form of flat sheets are known as _____

11. A new individual which represents a sudden departure from its parent type is called a (an) _____

12. A device which enables a person to discover the family to which a plant belongs is called a (an) _____

13. The goldenrod is a member of the family _____

14. The most practical way to combat the stem rusts of cereals is to sow varieties which are _____

15. The protococcus belongs to the group of plants known as _____

PART II. Select the best statement to complete each sentence. Put the NUMBER of that statement in the space at the right.

(one mark for each correct answer)

1. A narrow cup-bodied animal which travels with a somersaulting motion is the (1) euglena, (2) hydra, (3) volvox, (4) vorticella _____

2. The mould-like network of threads in the soil from which the stem of a mushroom grows is the (1) rootlet, (2) veil, (3) amanita, (4) mycelium _____

3. Animals which live on the leaves of shrubs and trees are called (1) carnivores, (2) grazing animals, (3) insectivores, (4) browsing animals _____

4. The ring that extends the sheath a little farther upward around the stem is the (1) filament, (2) ligule, (3) node, (4) spikelet _____

5. Horsetails belong to the Division (1) Spermatophytes, (2) Pteridophytes, (3) Thallophytes, (4) Bryophytes _____

6. The process by which the original material of a fossil has been replaced cell by cell by minerals such as silica or calcium carbonate is called (1) mould and cast, (2) assimilation, (3) petrifaction, (4) actual preservation _____

7. A plant which lives upon dead or decaying plants or animals is called a (an) (1) parasite, (2) legume, (3) saprophyte, (4) alga _____

8. A bird that does more harm than good is the (1) Snowy Owl, (2) Sparrow Hawk, (3) Cooper's Hawk, (4) Blackbird

9. The latest plants to make their appearance on earth were the (1) horsetails, (2) roses, (3) ferms, (4) fungi _____

10. Joining the bud of one tree to the stem of another so that it becomes a living part of it is called (1) grafting, (2) pruning, (3) cutting, (4) bracing _____

Values

5 PART III. Complete the following table by filling in in the blank spaces as shown in the example.

| | Type of Plant | Method of Reproduction |
|---|---|---|
| Example: Sweet clover | flowering | seed |
| Mermaids Tresses | | |
| Puffballs | | |
| Reindeer Moss | | |
| Coccus | | |
| Oats | | |

PART IV. Match the following by placing the NUMBER from "A" in the space at the right of "B". (one mark for each correct answer)

8x1 (i)

| "A" | "B" | |
|---|---|---|
| 1. Bacillus | (a) Nodules | _____ |
| 2. Mustard Family | (b) Polyps | _____ |
| 3. Corn Tassel | (c) Naked Seed | _____ |
| 4. Stem Rust | (d) Bacterium | _____ |
| 5. Nitrogen-fixing Bacteria | (e) Rosette | _____ |
| | (f) Embryo Plant | _____ |
| 6. Thistle | (g) Achene | _____ |
| 7. Cup-bodied | (h) Shrivelled Kernel | _____ |
| 8. Alga | | |
| 9. Conifer | | |
| 10. Dicot Seed | | |
| 11. Buttercup | | |

7x1 (ii)

| "A" | "B" | |
|---|---|---|
| 1. Fossil | (a) Zebra | _____ |
| 2. Crayfish | (b) Wallaby | _____ |
| 3. Parasite | (c) Skink | _____ |
| 4. Reptile | (d) Gill Bailer | _____ |
| 5. Amphibian | (e) Cephalopod | _____ |
| 6. Ungulate | (f) Living Host | _____ |
| 7. Insectivore | (g) Toad | _____ |
| 8. Primate | | |
| 9. Marsupial | | |
| 10. Omnivore | | |

Values

PART V. NOTE: Answers must be given in the form of complete sentences.

4 1. State ONE similarity between each pair of the following:

(a) Hydra - Polyp

_____

(b) Bat - Mole

_____

(c) Paramonoecium - Vorticella

_____

(d) Ringworm - Stem rust

_____

3 2. List THREE reasons why grasses are the most valuable of all food plants.

_____

_____

2 3. What TWO characteristics of plants of the Mustard family make them difficult to control as weeds?

_____

_____

4 4. Define or identify the following terms:

Diatoms _____

Mushroom Spawn _____

Pasteurization _____

Ruminants _____

$1\frac{1}{2}$ 5. (a) Describe in detail the means by which a crayfish maintains its balance.

_____

_____

Values

$2\frac{1}{2}$ 5. (b) In correct order state the five stages through which vertebrates developed.

_____

1 6. (a) What is the purpose of blubber in the whale?

_____

(b) Define "Pedigree"

_____

2 (c) State FOUR reasons why people drink alcoholic beverages.

_____

_____

_____

6 7. Use a complete sentence to explain each term listed below. Distinguish between:

(a) Internal Skeleton _____

External Skeleton _____

(b) Silique _____

Stipules _____

(c) Tap root _____

Fibrous root _____

NOTE: Do Questions 8 OR 9, but not both.

3 8. (a) Make a carefully labelled drawing of the flower of the legume plant OR of the grass plant.

Values

2 8. (b) Show by means of a "floral formula" the number of each of the flower parts in the family you selected in part (a).

OR

5 9. By means of labelled drawings and discussion, explain how the corn plant differs from other members of its family with regard to (i) flowers, (ii) stem, (iii) roots.

DIRECTIONS: NOTE: Do Question 10 OR 11, but not both.

1 10. (a) What substance serves as the food for yeast in the fermentation process?

_____

2 (b) Name the two main products of fermentation.

_____

2 (c) Tell which of the above products is useful in the baking of bread. Explain the part it plays.

_____

_____

_____

_____

Values

OR

5 11. "The bodies of plants and animals that are built up of many cells grow to full size in five different ways." Name the five ways and give one example of each.

(10x$\frac{1}{2}$)

| Way | Example |
|---|---|
| | |
| | |
| | |
| | |
| | |

9 12. "Certain life processes are common in all living bodies." Name six of these processes and clearly explain each in the space provided below.

| | Process | Explanation |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |

Values

5 13. State five facts that can be learned from a study of fossils.

_____

_____

_____

_____

DIRECTIONS: NOTE: Do Question 14 OR 15, but not both.

4 14. "In order to thrive bacteria must have sufficient heat and moisture and suitable food." Name the four common methods of food preservation, and in each case, tell which of the above conditions is lacking to make it effective, or tell how the method is effective.

_____

_____

_____

_____

_____

OR

4 15. Describe an experiment by which you were able to learn the effect upon a bacterium of a strong sugar or salt solution. Briefly describe that effect.

_____

_____

_____

_____

_____

_____

Name of Inspector _____

Name of Student _____

School _____

Room Number _____

DEPARTMENT OF EDUCATION

Manitoba

EXAMINATIONS, JUNE, 1960

GRADE IX

MATHEMATICS

Friday, June 24th, 9.00 to 11.30 a.m.

Examiners: J. D. Orchard, M. Styba.

NOTE: All questions will be answered on the question paper and the answers put in the spaces provided. Rough work may be done on paper supplied by the school.

## SECTION A

Perform the operations indicated. Reduce fractional answers to lowest terms.

| Values | | | Answer |
|---|---|---|---|
| 20x1 | 1. | Add: 12.42 + 156.008 + .982 + 3.629 + 7 | |
| | 2. | Subtract: 30035 - 20958 | |
| | 3. | Multiply: .296 x .087 | |
| | 4. | Divide: .0875 ÷ .025 | |
| | 5. | Add: 23-5/8 + 12-5/6 + 3-3/4 | |
| | 6. | Subtract: 10-1/4 - 6-5/6 | |
| | 7. | Multiply: 10-2/3 x 2-5/8 x 3/14 | |
| | 8. | Divide: 1-1/24 ÷ 3-3/4 | |
| | 9. | Express .086 as per cent. | |
| | 10. | Find 2/5% of 40. | |
| | 11. | 14% of what number is 42? | |
| | 12. | Express 187% as a decimal. | |
| | 13. | What number is 30% more than 50? | |
| | 14. | Find the value of $\sqrt{7569}$ | |
| | 15. | Simplify: $7/8 - (1/3 + 1/4) \div 2/3$ | |
| | 16. | Simplify: $\dfrac{1/2 + 3/4}{1 - 1/2 \times 3/4}$ | |
| | 17. | Change 3.6 metres into centimetres. | |
| | 18. | A field 40 rods square contains how many acres? | |
| | 19. | Express 37 ten-thousandths as a decimal fraction. | |
| | 20. | Express 3/16 as a decimal and round it off to the nearest hundredth. | |

## SECTION B
## PROBLEMS

Solutions to problems must be shown in spaces provided.

2 1. (a) The area of a triangle is 96 square inches. If its altitude is 12 inches, find its base.

_____

_____

_____

2 (b) The parallel sides of a trapezium are 10 inches and 6 inches respectively. If they are 8 inches apart, what is the area of the trapezium?

4 2. The smokestacks of an ocean liner are $10\frac{1}{2}$ feet in diameter and 48 feet high. How much will it cost to paint one of them at 21¢ per square yard? (Use $\pi = 22/7$)

4 3. A salesman receives $200 per month salary plus a commission of $5\frac{1}{2}\%$ of all sales he makes over $2500. If his sales for the month of May were $4230, how much did he earn in the month of May?

4 4. A merchant tailor's expenses were 20% of his sales and his profits were 15% of his sales. At what price should he mark a suit which costs him $32.50?

4 5. One-third of a boy's journey was downhill, two-fifths was on a level roadway, and the remainder was uphill. If he walked 2 miles uphill, find the length of his journey.

## SECTION C
## ALGEBRA

Place answer only in space provided.

20 x $\frac{1}{2}$ Solve:

1. $x + 4\frac{1}{2} = 8$ _____
2. $5x - 3 = 27$ _____
3. $5/6c = 80$ _____
4. $5x = 3x + 6$ _____
5. $9x = 36$ _____
6. $5 + x = 0$ _____

Simplify:

7. $(-1)(-1)(-1)$ _____
8. $\frac{m^2r^3s^4}{mrs^4}$ _____
9. $3(4 + 2)^2$ _____
10. $(3r^2m)^3$ _____
11. $-a(2a^2 - 3)$ _____
12. $\frac{(3m)^3}{3m}$ _____
13. $(-2)^4$ _____
14. $(-b^2)(-b^3)$ _____
15. $\frac{30m}{-10m}$ _____
16. $(-\frac{1}{2}) + (-\frac{1}{4})$ _____
17. Square $\frac{1}{2}a^2b^2c$ _____
18. Cube $.2a^2b$ _____
19. Subtract $-3x$ from $7x$ _____
20. Add $-7ab$ and $ab$ _____

## SECTION D

Show all necessary work.

2 1. If $b = 4$, $c = 3$, $d = 1$, find the value of $\frac{4(bc - 2d)}{9(2bc - 4)} =$

2. Simplify $(x-4)(x+5) + (x-7)(x-3)$.

3. Collect like terms: $6b^3 - 4b^2 + 2b + 8 - 3b^2 - 4b - b^3 + 6b$.

4. Solve: $14 - (2x-7) = 6x - 5(4x-9)$

5. Divide: $15x^2 + 11x - 14$ by $5x + 7$.

6. Subtract $2a^2 + 4a - 2$ from the sum of $a^2 + 5a - 1$ and $3a^2 + a - 4$.

7. Solve: $(x+4)(x-3) = (x-2)(x+1)$.

8. Find the value of $\underline{l}$ in the formula $p = 2\underline{l} + 2w$ if $p = 38$, $w = 7$.

## SECTION E

Solve using equations:

3 1. George is 5 years older than Mary. If the sum of their ages is 47, how old is each?

3 2. The first side of a triangle is 2 inches less than the second side; the third side is 3 inches more than the second side. Find the three sides if the perimeter of the triangle is 88 inches.

4 3. The sum of three numbers is 96. The second number is 3 more than twice the first while the third number equals the sum of the first two. Find the numbers.

## SECTION F

## GEOMETRY

Write the answers in the spaces provided:

8 x $\frac{1}{2}$ (a) A quadrilateral with two parallel sides is called a _____

(b) A figure bounded by two radii and an arc of a circle is called a _____

(c) A straight line joining any two points on the circumference of a circle is called a _____

(d) Any two angles whose sum is $180^{o}$ are known as _____ angles.

(e) The sum of the angles of any quadrilateral is _____ degrees.

(f) The complement of an angle of $37^{o}$ is _____ degrees.

(g) A straight line cutting two or more other straight lines is called a _____.

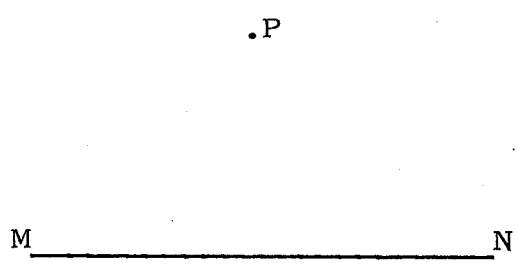
(h) The line joining a vertex of a triangle to the mid-point of the opposite side is called a _____.

2. Do the following constructions. Do not describe the method but leave all construction lines.

Use ruler and compasses only.

3 (a) Draw any obtuse $\angle ABC$ and bisect it.

4 (b) Given a line MN and a point P outside the line. Through P draw a line parallel to MN.




4 (c) Construct a triangle PQR having $\angle Q = 90^{\circ}$, PQ = 1-3/4 inches and PR = $2\frac{1}{2}$ inches.

# APPENDIX C

## SAMPLE SET OF GRADE X EASTER EXAMINATIONS

## KELVIN HIGH SCHOOL

APPENDIX C

Kelvin H. School

March, 1961
Time: 2 hrs.

LITERATURE - GRADE X

Values:

NOTE: Students are advised that all Composition rules must be observed in writing this paper. Marks will be deducted for misspelled words.

Be guided by the suggested time allotment for each question.

TWELFTH NIGHT

I. Choose FOUR of the following quotations and for each give the speaker, the circumstances under which the words were spoken, and the significance or meaning of the quotation. (twenty minutes)

(4x4) 16

(a) "I could marry this wench for this device."
(b) "But come what may, I do adore thee so,
That danger shall seem sport, and I will go."
(c) ".....and she pined in thought
And with a green and yellow melancholy,
She sat like Patience on a Monument,
Smiling at grief."
(d) "Go write it in a martial hand, be
curst and brief: it is no matter
how witty, so it be eloquent, and full
of invention."
(e) "But oh, how vile an idol
proves this god."
(f) "This is the air, that is the glorious sun,
This pearl she gave me, I do feel't
and see't
And though 'tis wonder that enraps me thus,
Yet 'tis not madness."
(g) "Come, boy, with me, my thoughts are ripe in
mischief:
I'll sacrifice the lamb that I do love
To spite a raven's heart within a dove."

II. Do ONE of the following two questions (twenty-five minutes)

15 (a) Discuss the functions of the fool in Olivia's household. What qualities would a person have to have to be successful as a jester? In your answer refer specifically to Feste in "Twelfth Night".

(b) Mistaken identity is a device used by Shakespeare in "Twelfth Night" not only to complicate situations but also increase the humour. Discuss this statement referring directly to the play.

III. Write a character sketch of ONE of the following:

Viola, Olivia, Malvolio, Sir Andrew.

In your sketch, which is to be organized in good paragraph form, bring out at least <u>four</u> characteristics. Make specific references to the play to illustrate each of these characteristics.

(thirty minutes)

## <u>THE GOLDEN CARAVAN</u>

IV. Discuss either "FALSE COLOURS" <u>or</u> "A FRIEND OF NAPOLEON" as an example of a short story.

15 Keeping in mind the definition, and the elements of characteristics of a short story, show how far the selection you have chosen fulfils these requirements.

(twenty-five minutes)

V. (a) According to Robert Kelley, what qualities

3 must a good hockey player possess?

2 (b) What are the reasons for the popularity of hockey?

- O R -

With direct reference to the story "CROCODILES AND CANNIBALS", discuss Mary Kingsley's character. Mention <u>three</u> qualities.

(five minutes)

VI. Name the selection from which each of the following is taken, and explain their significance in the story.

(3x3) (1) "Us been thinkin' just that," he said. "It's

9 for nothin' but pleasurin' and it's queer they ain't laws to stop it."

(2) "Do you believe in Metempsychosis?"
"......Of course not. That's purely pagan."

(3) "I find you guilty. Your crime is patriotism in the first degree."
(ten minutes)

---

80

20 Term Marks

---

100 Total

---

GRADE X (K.H.S.) March, 1961
Time: 2 Hrs.

## COMPOSITION AND GRAMMAR

Values:

I. From each of the following groups of words choose the misspelled word and write it correctly in the blank at the right. FORM EACH LETTER WITH CARE.

(10x½)

| | | | | | |
|---|---|---|---|---|---|
| 1) | participle | opponent | discription | dependent | _____ |
| 2) | quiet | writting | baggage | partially | _____ |
| 3) | rythm | pursue | principally | altogether | _____ |
| 4) | humerous | Arctic | modifier | eligible | _____ |
| 5) | accommodate | benefited | acquitted | priviledge | _____ |
| 6) | disastrous | repitition | prophecy | rogue | _____ |
| 7) | atheletic | weird | bookkeeper | therefore | _____ |
| 8) | restaurant | surprising | lonliness | suspense | _____ |
| 9) | performance | destructive | measurable | argueing | _____ |
| 10) | courageous | carring | separate | oblige | _____ |

II. In each group below, select the word or expression that most nearly expresses the meaning of the word at the left. Write the number of the word in the space at the right, as in the following example:

6

e.g. perfunctory 1.detailed 2.careless 3.rapid 4.sweet-smelling 5.exploratory _____

credulity 1. truthfulness 2. cynicism 3. honesty 4. disbelief 5. ready belief _____

recompense 1. avenge 2. praise 3. repay 4. chide 5. substitute _____

pathos 1. sadness 2. regret 3. impatience 4. loss 5. loneliness _____

churlish 1. coarse 2. ill-natured 3. adamant 4. humble 5. elegant _____

chaos 1. confusion 2. discord 3. storm 4. revolution 5. boat _____

pensive 1. thoughtful 2. honorable 3. ancient 4. paltry 5. understanding _____

III. Indicate in the table provided the part of speech of each underlined word in the following sentences and state its use in the sentence:

($6 \times \frac{1}{2}$)

(a) Through its size, China, a land of mystery, ranks high on the list of Asiatic countries.
(b) Exhausted, the athlete threw himself down on the grass.
(c) Watching the game was a pleasure to be enjoyed by the feeble old man.

| WORD | USE | RELATION |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

IV. Underline the correct word in parenthesis in the following sentences:

(1) The teacher refused to (accept, except) the late assignment.
(2) Good school spirit has a fine (effect, affect) on the student body.
(3) In stealing from the child the thief did a very (contemptuous, contemptible) thing
($8 \times \frac{1}{2}$) (4) At the evening wedding reception the guests dressed very (formally, formerly).
(5) A student who studies hard is not so (likely, liable) to fail as one who loiters at a bowling alley every evening.
(6) We have had (fewer, less) blizzards this year than last.
(7) Mr. Johnson was (notorious, noted) at the flower show for his prize-winning roses.
(8) The orchestra gave a very (creditable, credible) performance at the concert.

V. In the spaces provided re-write the following sentences correctly. If you consider sentences have no grammatical errors, write the word CORRECT in the spaces below them.

(1) The little girl who my mother is calling is my sister.

20

_____

(2) As the old farmer sat looking into the distant gloom and listening to the poplar leaves which rustled on the weathered roof.

_____

_____

(3) Stanley is more popular than any boy at the rink.

_____

(4) He always has and always will as long as he practises so hard.

_____

(5) We guarantee that everyone in the class will do their best to work for the Red Cross.

_____

_____

(6) The cause of these diseases is chiefly poor sanitation.

_____

(7) The weary scouts hiked four hours in the rain and then the tent was pitched.

_____

_____

(8) At the winter carnival the great event of the day is when the dog races are run.

_____

_____

(9) The janitor's duties included opening and closing the building and to see that the fixtures were kept in repair.

_____

_____

(10) The boys that reached the rink early had the longest practice.

_____

_____

(11) Lorne has studied hard which should bring him success.

_____

(12) Marion told Jean that her library book was overdue.

_____

(13) Sitting in their car, the entire game could be seen.

_____

(14) It looked like it would snow all day.

_____

(15) I bought ice cream from the store that is near the corner almost every Saturday.

_____

_____

(16) If I was you, I should not do that.

_____

(17) He was asked to carefully and thoroughly criticize the manuscript.

_____

_____

(18) Didn't you realize that it was she who had found the ring?

_____

(19) Although he swallowed a little soup, he isn't no better than he was yesterday.

_____

_____

GRADE X
Kelvin High School

Easter, 1961
Time: 2 hrs.

GEOGRAPHY

Teacher_____ Room No.____ Name_____

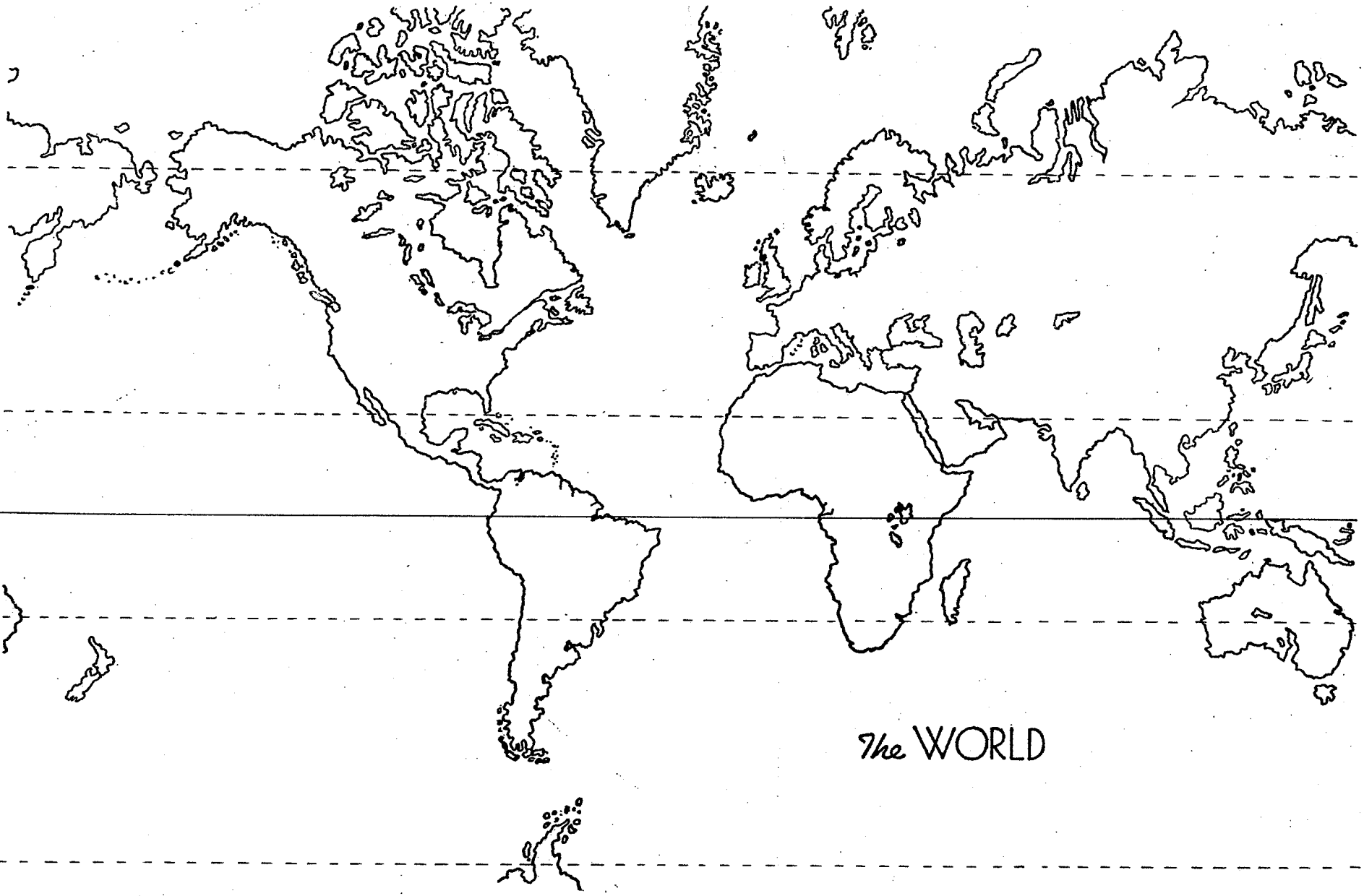
Values:

I. On the map provided, print neatly in the correct places:
RICE, in the part of China where it is grown.
COTTON, in the part of the United States where it is grown.
DOUGLAS FIR, where these trees grow in North America.
PAMPA, in the appropriate part of South America.
TEA, in the part of India where it is grown.
IRON, where it is mined in Quebec.
15x1 FISHERIES, in the waters around Japan.
U.N. HEADQUARTERS, (locate with a dot as well as the name)
THE CONGO
UNION OF SOUTH AFRICA
MOSCOW (locate with a dot as well as the name)
LONDON, (dot and name)
PARIS, (dot and name)
PEKING, (dot and name)
NORTH ATLANTIC DRIFT

II. On the accompanying diagram of an east-coast mountain in the tropics, the arrow indicates the direction of the wind.

(a) Print, in the correct places, (on the mountain): BANANAS, WHEAT, ALPINE MEADOWS

(b) Print (just above the mountain): PRECIPITATION (at the place where it would occur), and DRY AIR (where it would be found).


The WORLD

III. Fill in the spaces in the chart below by finding the right items in the lists under the chart. Not all the items will be used, and some may be used more than once.

15x1

| | Soil | Precipitation Per Year | Region |
|---|---|---|---|
| Cotton Belt | | | |
| Spring Wheat Belt | | | |
| Corn Belt | | | |
| Steppe | | | |
| Taiga | | | |

Soils: podsols, prairie soil, black prairie soil, chestnut brown soil, red and yellow forest soil, grey desert soil, loess.

Precipitation: 0"-10"; 10"-20"; 20"-35"; 23"-30"; 25"-40".

Regions: Canadian Shield, Great Plains, Southern Saskatchewan, North West Territory, Mississippi, and Louisiana, Illinois and Indiana.

ESSAY QUESTIONS: Do on foolscap. Up to 3 marks per essay may be deducted for errors in grammar and spelling.

LAND FORMS: Answer <u>either</u> Question IV <u>or</u> Question V.

IV. (a) What are the difficulties in living in a mountain region? 15

(b) How have mountain people overcome these difficulties? Illustrate by referring to either Switzerland or the Canadian Rockies.

V. (a) Explain briefly five ways in which plains may be formed. 5x2

(b) Explain why cities are located along a fall line. Give two or more cities as examples. 5

RESOURCES AND CONSERVATION: Answer <u>either</u> question VI or VII.

VI. For either Coal <u>or</u> Petroleum, explain:
(a) how it is formed
15 (b) how it is extracted from the earth
(c) location of five important world sources
(d) uses and by-products

VII. (a) Explain the ways in which forests may be
5 destroyed. What methods of conservation have been developed?
(b) In what ways may fisheries be destroyed? What
5 are some methods of conservation that apply to commercial fisheries?
(c) How may sloping farm land be ruined? What
5 methods of soil conservation would prevent this?

MANUFACTURE AND TRADE: Answer <u>either</u> question VIII or IX.

VIII. (a) What are the factors to consider in determining where an industry should be located? Explain each in a sentence.

(b) In view of these factors explain the location of Canada's
i) fish canneries
5x2 ii) textile and clothing industry
iii) steel industry
iv) meat packing industry
v) aluminum refineries

IX. Give the location of an important industrial region in each area below. Tell what each produces, and how this is related to resources or general geography.
a) Canada
5x3 b) The United States
c) The Soviet Union
d) Europe (apart from Russia)
e) Asia (apart from Siberia)

80
<u>20 Term Marks</u>
100

GRADE X
Kelvin High School

March, 1961
Time: 2 Hrs.

MATHEMATICS

Values:

PART "A"

1.(a) If x=-2 find the value of $3x^2+2x-5$

(b) By how much is 2x-5 greater than 3x-7?

12x2

(c) Multiply $(2a-3b)(3a-2b)$

(d) Factor $x^2-6xy+9y^2$

(e) Multiply $(2x-5)^2$

(f) Divide $-32a^3b^2$ by $4a^3$

(g) Factor $9a^4 - 16$

(h) Factor $8x^2 + 2xy - 21y^2$

(i) Solve for x: $10 = \frac{3x}{4} + 2$

(j) Solve for g: $S = \frac{1}{2} gt^2$

(k) Solve for y:
$3(y+6) =$
$7(-y-2) + 3y-3$

(l) Solve for x:
$4.5x = 2x + .5$

NOTE: Use foolscap for the remaining Algebra questions:

II. Solve for x:

4

$$\frac{3x-5}{10} = 1 + \frac{7x-1}{30}$$

III. Solve for x and y:

$$3x + 4y = 5$$
4 $$6x + 12y = 18$$

IV. Using graphs - solve for x and y:

$$3x - y = -7$$
5 $$2x + y = 2$$

V. Divide: $9x^3 - 12x^2 - 6 + 13x$ by $3x-2$

VI. Do TWO of the following problems using algebraic equations - show all work.

(2x5)

(a) Five cans of corn and 4 cans of peas cost $1.27. Three cans of corn and 6 cans of peas cost $1.41. Find the cost of each can of peas, and of corn.

(b) A man invests $9,000.00, part at $5\frac{1}{2}\%$ and the remainder at 7%. His income from his investment is 6% of his investment. How much does he invest at each rate?

(c) 500 tickets were sold for a concert, some at 75¢ each and the rest at 50¢ each. If the total gate receipts were $331.25, how many of each kind were sold?

PART "B" - GEOMETRY

I. Write out on foolscap the theorem:

If two triangles have two angles and any side
8 of one respectively equal to two angles and the corresponding side of the other, they are congruent.

II. Draw your diagram and prove: that the lines drawn
6 from the mid-points of the sides of an isosceles triangle, perpendicular to the base are equal.

DO THE FOLLOWING QUESTIONS IN THE SPACES PROVIDED.

III. Fill in the blanks:

(a) A four-sided figure with only two sides
(5x1) parallel is a _____

Values:

(b) If two triangles have the three angles of the one equal to the three angles of the other, the triangles are _____

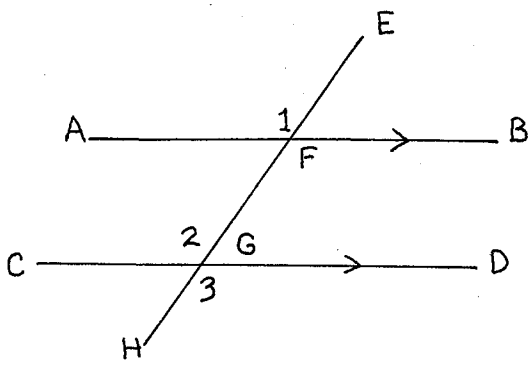
(c) Lines which have the same direction are _____

(d) The line from any vertex of a triangle perpendicular to the opposite side is called a (an) _____ of the triangle.

(e) If one angle of a triangle is obtuse then the other two angles are _____

IV.

4

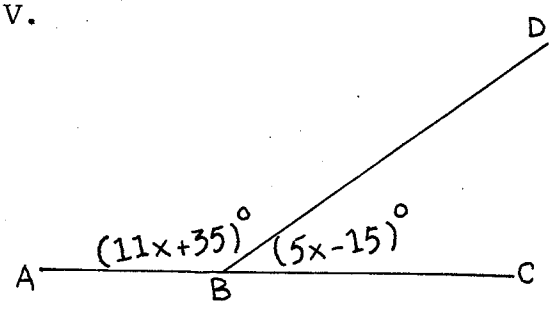



Given AB∥CD

Prove ∠1 = ∠3

V.

(3+2)

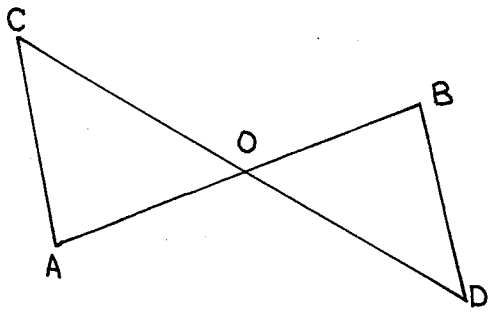



Given ABC is a straight line.
∠ABD = $(11x+35)^{\circ}$
∠CBD = $(5x-15)^{\circ}$

(a) Find x

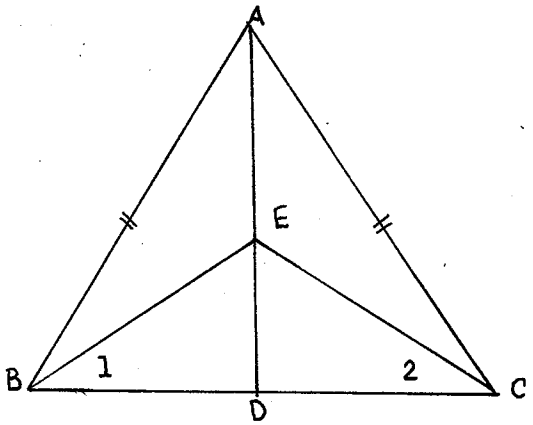
(b) Find size of ∠ABD
_____degrees.

VI. 5



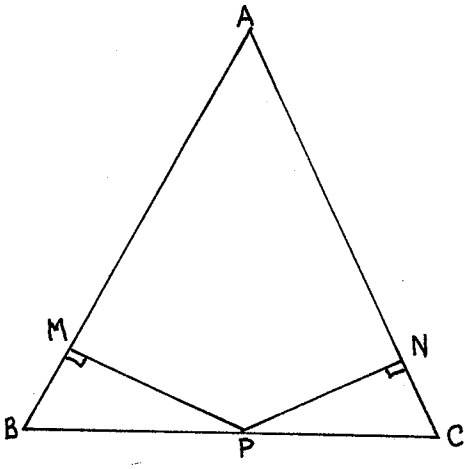

Given AB and CD are straight lines bisecting each other at O.
Prove AC∥BD

VII. 5



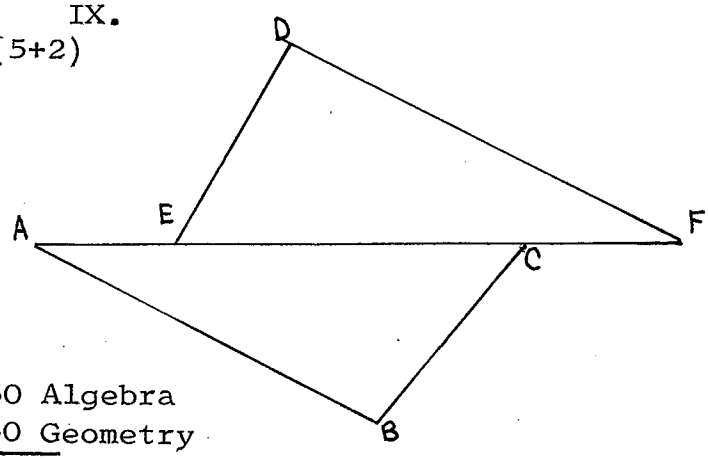

Given △ ABC with AB = AC. DA bisects ∠BAC.
Prove ∠1 = ∠2

VIII. 5




Given △ ABC
P is midpoint of BC
PM ⊥ AB
PN ⊥ AC
PM = PN
Prove △ ABC is isosceles.

IX. (5+2)




Given AECF is a straight line. AE = CF
ED = BC
AB = DF
(a) Prove △ ABC ≡ △ DEF
(b) Prove AB ∥ DF

50 Algebra
50 Geometry
100 Total

GRADE X
Kelvin High School

March, 1961
Time: 2 hrs.

SCIENCE

Values:

PART "A"

30x1 1. If we neglect friction, the mechanical advantage of a single movable pulley is _____

2. An instrument for determining the presence, size and direction of an electric current is _____

3. A chemical that we studied which will produce oxygen when heated is _____

4. Short pins off centre of large gears that are used to change rotary motion to reciprocating motion are called _____

5. The number of atoms in the molecule of the compound $Ca_3 (PO_4)_2$ is _____

6. The amount of matter of a substance in a certain space is known as _____

7. The number of Centigrade degrees to which $86^o$ Fahrenheit is equivalent is _____

8. A chemical used to remove suspended material from water is _____

9. One mineral dissolved in water that makes the water hard is _____

10. The type of faucet that would most likely be used in public places is _____

11. The number of horse power in a 3000 kilowatt water turbine is _____

12. In a wheel and axle the wheel has a circumference of $5\frac{1}{2}$ ft. and the axle has a diameter of 3 inches. The mechanical advantage of the machine is _____

13. When molecules of heated gas or liquid actually move from one place to another, heat is transferred by the process called _____

14. In Chemistry, the abbreviation used to represent a compound is called _____

15. The layer of rock through which ground water will not pass is known to scientists as _____

16. The number of cylinders that a four stroke cycle gasoline engine must have to get two pushes of the piston during one revolution of the crank shaft is _____

17. The unit which measures the rate of flow of electricity is _____

18. The resistance offered to motion when two surfaces roll one over the other is called _____

19. The rate at which work is done is known as _____

20. Scientists have been able to discover the kinds of substances of which the sun is made by use of the _____

21. On a 110 voltage, the number of 40 watt bulbs that can be turned on before a fuse marked 20 amps will melt or "blow" is _____

22. The name of a gas commonly used in a refrigerator is _____

23. A device which measures the electrical pressure of a current is _____

24. The number of calories of heat required to change 5 grams of ice to 5 grams of water at $50^{\circ}$ Centigrade is _____

25. Of the three men, Copernicus, Aristarchus and Galileo, the first man who thought that the earth travelled around the sun was _____

26. Hard coal that has approximately 95% pure carbon is called _____

27. At 5 cents a kilowatt hour, the cost to use a 550 watt waffle iron for 8 hours would be _____

28. The stream of a force pump is smoothed out by means of _____

29. We would describe the kind of change that takes place when wax melts as _____

30. Several electrical devices can be individually controlled when they are connected in _____

PART "B"

(1) 1. (a) Why does painting a piece of iron prevent it from rusting?

(1) (b) Why does food keep longer when it is kept in a cool place?

(1) (c) Why is hydrogen peroxide kept in brown bottles?

(3) (d) State THREE facts you have learned about evaporation.

(4) 2. (a) Describe briefly FOUR ways of purifying water, stating what impurities are removed in each method.

(2) (b) What is a calorie?
How many calories of heat are released when 10 grams of steam condense into water at $100^{o}$ C.?

(6) 3. Draw neat labelled diagrams of a lift pump in operation. Describe the action briefly but fully.

(6) 4. A jack-screw has a pitch of $\frac{1}{4}$ inch and a handle $3\frac{1}{2}$ feet long. What effort at the end of the handle will be required to lift a load of 19,008 lb. weight?

(6) 5. A hockey player has a stick that is 5 feet long. If he holds one end in his left hand with his right one foot away and exerts a force of 40 pounds, what resistance has he overcome? What is the M.A.?

(3) 6. (a) Give THREE ways in which machines help us to do work.

(b) Draw a diagram of a pulley system showing how a weight of twenty lbs. can be raised by a force of five lbs. If the force moves 20 inches how far does the weight move?

(6) 7. A man uses a nine foot board as an inclined plane to move a 120 pound trunk into a truck 3 feet high. He exerts a force of 45 pounds.

(a) How much work does he do in sliding the trunk up the board?

Values:

(b) How much work would he do if he lifted the trunk into the truck?
(c) How much extra work does he do in sliding the trunk up the inclined plane rather than lifting it?
(d) What causes the extra work?
(e) What is the efficiency of the machine?
(f) What is the M.A.?

(3) 8. (a) Explain the advantages steam turbines have over steam engines.
(2) (b) Explain TWO disadvantages steam turbines have over the steam engine.

(4) 9. (a) Using drawings to help you, explain the FOUR strokes of the piston in a gasoline engine, telling what happens during each stroke.
(b) State TWO differences between the Diesel engine and the ordinary gasoline engine.

(3) 10. (a) Draw a cross-section of a dry cell and label the different parts.
(2) (b) Explain how the dry cell works in order to produce an electric current.
(1) (c) What is the advantage of the dry cell?

(2) 11. An electric iron was used for three hours. The iron required 450 watts to operate it. How many watt-hours of energy did the iron use? How many kilowatt hours?

(4) 12. All gasoline engines have four systems, each doing a special job towards the efficiency of the machine. Name these systems and explain each briefly.

(4) 13. A five horse-power moved an object weighing $2\frac{1}{2}$ tons a certain distance in 20 seconds. If it was working to full capacity, and no allowance was made for friction, how far was the object moved?

70

+30

100 TOTAL MARKS.

GRADE X
Kelvin High School

March, 1961
Time: 2 Hrs.

FRENCH

Values:

N.B. Answer questions I, II, III on the question paper. Do the remaining questions on foolscap.

I. (a) Donnez la forme correcte des verbes:

($\frac{1}{2}$x10) 5

| PRÉSENT | | PASSÉ INDÉFINI | |
|---|---|---|---|
| (acheter) ils | _____ | (écrire) elle | _____ |
| (manger) nous | _____ | (entrer) ils | _____ |

| IMPARFAIT | | PLUS-QUE-PARFAIT | |
|---|---|---|---|
| (commencer) jr | _____ | (entendre) nous | _____ |
| (réussir) elle | _____ | (monter) il | _____ |
| (être) vous | _____ | (se coucher) elles | _____ |

(b) Traduisez:

(1x5) 5

1. They began to talk _____
2. I had decided to take the car _____
3. She promised to come _____
4. We were always glad to go _____
5. You are right to stay at home _____

II. Remplacex les mots soulignés par des pronoms, et faites l'accord du participe passé:

($\frac{1}{2}$x10) 5

1. Il a vu <u>la glace</u> dans la rue. _____
2. J'ai envie de remettre <u>cet examen</u>. _____
3. Avez-vous montré <u>ces robes</u> <u>à votre mère</u>? _____
4. Ils n'ont pas donné <u>les paquets</u> <u>à mes amis</u>. _____
5. Nous avons apporté <u>des pigeons</u>. _____

III. Traduisez en français:

10

1. the school year _____
2. before the end _____
3. the pipe of my dreams _____
4. all the time _____
5. the lifeguard on duty _____
6. a typical day _____
7. in the fresh air _____

8. several times a day _____
9. his new car _____
10. seven o'clock in the morning _____

IV. Traduisez en français:

($\frac{1}{2}$x50)
25

On Saturdays there are no classes, but everybody finds lots to do.

Last week Paul went down town. When he was taking his place in the bus, he saw his friend Robert, who was going to Vancouver during the holidays.

Paul said, "I camped on the Canadian coast last summer. We swam and we played baseball. We had a good time."

When the bus arrived in front of a big store, Paul got out. A woman fell, but fortunately she was not badly hurt.

Paul crossed the street. He had several purchases to make. He bought a few postcards and looked at the model planes of different sorts. Then he went to the tobacco merchant's. He wanted to buy a pipe for his father's collection. There was a beautiful pipe on the counter. Paul bought it, and went home very happy.

V. Traduisez en bon anglais:

5 (a) Monsieur Montfleury comprend tout de suite: il y a des voleurs dans la maison, et ils empêchent sa femme de le prévenir. Monsieur Montfleury, homme pratique avant tout, ne s'arrête pas pour réfléchir. Vite il met son pardessus et son chapeau, ferme le bureau à clef, et court prendre un taxi au bout de la rue, pour aller le plus vite possible chez lui.

5 (b) --Nous pourrions donner quelque chose aux pauvres, dit-il; nous gagnerons peut-être quelque chose.

--Si tu veux, répond-elle, pas très enchantée, on peut essayer. Mais à qui donneras-tu ton quelque chose?

L'homme réfléchit un instant...

--Il y a le père Martin qui n'a presque plus de sabots ni d'habits, ou bien la Jeanne qui est veuve et qui a trois enfants sur les bras... J'y suis: je vais le donner au curé; il est le plus près du bon Dieu, ça reviendra plus vite.

VI. Traduisez en bon anglais:

(a) Enfin elle se lève. La peur lui revient. Elle n'a plus qu'une pensée, rentrer au village, courir à travers bois, à travers champs, jusqu'aux maisons, jusqu'aux fenêtres, jusqu'aux lampes des boutiques. Son regard tombe sur le seau, posé sur l'herbe devant elle. Malgré sa terreur, elle n'ose pas rentrer sans le seau d'eau. Elle fait ainsi quelques pas, mais le seau est plein et très lourd, elle est forcée de le mettre à terre.

(b) Cependant l'homme, après avoir laissé sur une chaise son bagage et son bâton, s'était assis à une table où Cosette lui avait servi du vin. Le voyageur qui avait demandé le seau d'eau était allé lui-même le porter à son cheval. Cosette avait repris sa place sous la table de cuisine at recommençait a tricoter son bas.

L'homme avait à peine commencé à boire son vin; il considérait l'enfant avec une attention étrange.

VII. Traduisez en bon anglais:

Un Normand entre un jour dans une boulangerie et demande un pain de deux <u>livres</u>. Le boulanger en lui offre un. Le Normand en demande le prix.

"Cinquante sous," répond le boulanger.

"Il n'a pas le poids," dit l'acheteur, en le <u>pesant</u> dans sa main.

"N'importe," réplique l'autre. "Il sera plus facile à porter.

Le Normand dépose alors quarante sous dans la main du boulanger.

"Ce n'est pas assez!" dit le boulanger.

"N'importe," répond le Normand. "Ce sera plus facile à compter!"

NOTE: la livre - the pound
peser - to weigh

---

80 Total
10 Aural
10 Term Mark

---

100

==========

# APPENDIX D

## SAMPLE SET OF GRADE XI JUNE EXAMINATIONS

## DEPARTMENT OF EDUCATION

APPENDIX D

Paper No. 29

HIGH SCHOOL EXAMINATION BOARD OF MANITOBA

(Representing Department of Education
and University of Manitoba)

---

EXAMINATIONS, JUNE, 1961

---

GRADE XI LITERATURE

Thursday, June 29th, 9.00 to 12.00 a.m.

Examiners: G. W. Battershill, Mrs. M. B. Bond,
W. G. Stobie, Miss M. J. Thomson, J. O. Turner.

---

IMPORTANT: All rough work must be done in the answer booklet.

---

NOVEL

Values

20 1. (Approximately 35 minutes.) Answer question on ONE novel only.

LORNA DOONE

(a) Describe and compare John Ridd's attitudes to each of his sisters.
(b) How do you account for the differences in these attitudes? Is the explanation to be found in the character of John or in the characters of the girls?
(c) How significant are John's reactions to the marriage of each girl?

OR

BAROMETER RISING

Show that Colonel Wain was often wrong in his judgments of people, and in his ideas about the war. What quality or qualities in his character led him to make these mistakes? In your answer, refer to three people as well as to the war.

OR

OLIVER TWIST

"Nancy is the only character in Oliver Twist who is a mixture of good and bad. All the rest are villains or saints." Do you agree with this statement? Explain your opinion and justify it by reference to four characters in the novel, in addition to Nancy.

SHORT PROSE

12 2. (Approximately 15 minutes.)

What is the emotional impression produced in the reader by the very end of "Hurry, Hurry!" (when the disclosure is made)? How does the part of the story up to the appearance of the man prepare for and contribute to this impression?

MACBETH

15 3. (Approximately 25 minutes.)

Thunder and lightning. Enter three WITCHES.

1. Witch When shall we three meet again?
In thunder, lightning, or in rain?
2. Witch When the hurlyburly's done,
When the battle's lost and won.
3. Witch That will be ere set of sun. 5
1. Witch Where the place?
2. Witch Upon the heath.

3. Witch There to meet with Macbeth
1. Witch I come, Graymalkin!
All. Paddock calls. Anon!
Fair is foul, and foul is fair.
Hover through the fog and filthy air. Exeunt

(a) What have the witches in common with the weather referred to in this scene?
(b) What does line 11 mean? How does it reveal the character of the speakers? How does it prepare for, or serve as a commentary on, the rest of Act I?
(c) What is the contribution of this scene to the total effect of the play?

14 4. (Approximately 25 minutes.)

Had he not resembled
My father as he slept, I had done't.
. . . . . .
Give me the daggers; the sleeping and the dead
Are but as pictures; 't is the eye of childhood
That fears a painted devil.

How do these two passages reveal the character of the speaker, Lady Macbeth? Account for the contradiction in them. Illustrate your answer with references to the play as a whole.

## POETRY

25 5. (Approximately 40 minutes.)

Name the authors and the titles of the poems from which FIVE of the following quotations are taken. In each case explain the quoted passage fully and show how it contributes to the total effect of the poem.

(a) That this most famous Stream in bogs and sands
Should perish.

(b) Earth's the right place for love:
I don't know where it's likely to go better.

(c) It somehow eased
My heart to know I was hurt, but I did not faint
And I could not stop while over me hung the range
Of the Sawback.

(d) Twilight and evening bell,
And after that the dark!
And may there be no sadness of farewell,
When I embark.

(e) We listened, but we only heard
The feeble cheeping of a bird
That starved upon its perch;
And, listening still, without a word
We set about our hopeless search.

(f) The wheat was embroidering
All the spring morning
Frail threads needled by sunshine like thin gold.

(g) I was ever a fighter, so--one fight more,
The best and the last!

SIGHT POEM

14 6. (Approximately 30 minutes.)

Plowman's Song

Turn under, plow,
My trouble;
Turn under griefs
And stubble.

Turn mouse's nest,
Gnawing years;
Old roots up
For new love's tears.

Turn, plow, the clods
For new thunder.
Turn under, plow,
Turn under.

(a) Show how details in each stanza of the poem describe the plowman's customary activities.

(b) What additional significance do you see in stubble, mouse's nest, and old roots?

(c) Can you justify the inclusion of the reference to new love's tears in a poem apparently about plowing?

(d) What is the mood of the speaker? By what means is it conveyed?

Paper No. 12

HIGH SCHOOL EXAMINATION BOARD OF MANITOBA

(Representing Department of Education
and University of Manitoba)

---

EXAMINATIONS, JUNE, 1961

---

GRADE XI COMPOSITION

Monday, June 26th, 9.00 to 12.00 a.m.

Examiners: G. W. Battershill, Mrs. M. B. Bond,
W. G. Stobie, Miss M. J. Thomson, J. O. Turner.

---

IMPORTANT: All rough work must be done in the answer booklet.

---

Values

15 I. REVISION. (Approximately 30 minutes.)

Listed below are some of the reasons for incorrect sentences:

(a) There is faulty parallelism.
(b) There is a dangling participle or gerund.
(c) There is a needless shift in tense or point of view.
(d) There is faulty reference of a pronoun.
(e) There is a period fault (sentence fragment).
(f) There is a comma fault (run-on sentence).
(g) There is faulty agreement of verb with subject.
(h) There is redundancy.

(i) There is a misplaced modifier.
(j) There is a needlessly split construction.

In your answer booklet, rewrite in formal standard English each sentence which contains an error, and indicate the nature of the error by placing after the sentence the appropriate letter from the above list. If a sentence needs no correction, write "Correct."

1. Jack told David it was his fault that the team had lost the game.

2. She directed him to draw up a will in favour of the one person in her family who she knew could have had no part in her accident.

3. It is important to analyze radio broadcasts in terms of purpose, presentation, and how they are sponsored.

4. A man approached the bridge intent upon suicide in a brown suit.

5. We swept the room carefully, and the furniture and shelves were also dusted.

6. Having gone to dances all winter, a picnic seemed the way to add pleasure to our summer.

7. Either you will do your work now or be penalized for disobedience.

8. In The Merchant of Venice, Portia shows her character in three ways. By her faith in Bassanio, by her treatment of unwelcome suitors, and by her treatment of Shylock.

9. It was universally agreed by everybody that John had more ability than his brother.

10. Always keep moving in a crowded corridor, if you must stop to talk, step inside a room.

II. PRECIS. (Approximately 40 minutes.)

In not more than 120 words, write a precis of the following passage:

Silence is unnatural to man. He begins life with a cry and ends it in stillness. In the interval he does all he can to make a noise in the world, and there are few things of which he stands in more fear than of the absence of noise. Even his conversation is in great measure a desperate attempt to prevent a dreadful silence. If he is introduced to a fellow-mortal, and a number of pauses occur in the conversation, he regards himself as a failure, a worthless person, and is full of envy of the emptiest-headed chatterbox. He knows that ninety-nine percent of human conversation means no more than the buzzing of a fly, but he longs to join in the buzz, and to prove that he is a man and not a waxwork figure. The object of conversation is not, for the most part, to communicate ideas; it is to keep up the buzzing sound. There are, it must be admitted, different qualities of buzz; there is even a buzz that is as exasperating as the continuous ping of a mosquito. But at a dinner party one would rather be a mosquito than a mute. Most buzzing, fortunately, is agreeable to the ear, and some of it is agreeable even to the mind. He would be a foolish man, however, who waited till he had a wise thought to take part in the buzzing of his neighbours. Those who despise the weather as a conversational opening seem to me to be ignorant of the reason why human beings wish to talk. Very few human beings join in a conversation in the hope of learning anything new. Some of them are content if they are merely allowed to go on making a noise into other people's ears, though they have nothing to tell them except that they have seen two or three new plays or that they had had bad food in a Swiss hotel. At the end of an evening they justly plume themselves on their success as conversationalists. I have heard a young man holding up the monologue of a prince among modern wits for half an hour in order to tell us absolutely nothing about himself with opulent long-windedness. None of us except the young man himself liked it, but he looked as happy as if he had a crown on his head.

(397 words)

60 III. ESSAY. (Approximately 100 minutes.)

In formal standard English, write a carefully organized, well developed composition of 400 to 500 words on one of the following topics:

Soil and Water Conservation Are Essential to Survival
Collecting Records Is a Fascinating Hobby
Is Curling An Old Man's Game?
Does Education Increase Happiness?
My Stake In the Future of Canada
A Genius of Science
An Explorer of the Canadian West
Socialized Medicine
Women Are Better Drivers than Men
The Value of 4-H Groups
Maturity Has Its Drawbacks

Paper No. 8

HIGH SCHOOL EXAMINATION BOARD OF MANITOBA

(Representing Department of Education
and University of Manitoba)

---

EXAMINATIONS, JUNE, 1961

---

GRADE XI HISTORY

Friday, June 23rd, 9.00 to 12.00 a.m.

Examiners: J. A. Ashley, A. W. Davie, R. Glover

---

Candidates are reminded that clear expression and general literacy will be considered in the grading of all answers.

---

IMPORTANT: All rough work must be done in the answer booklet.

---

Candidates will do all Section A, and ONE question from each of Sections B, C, D, E and F.

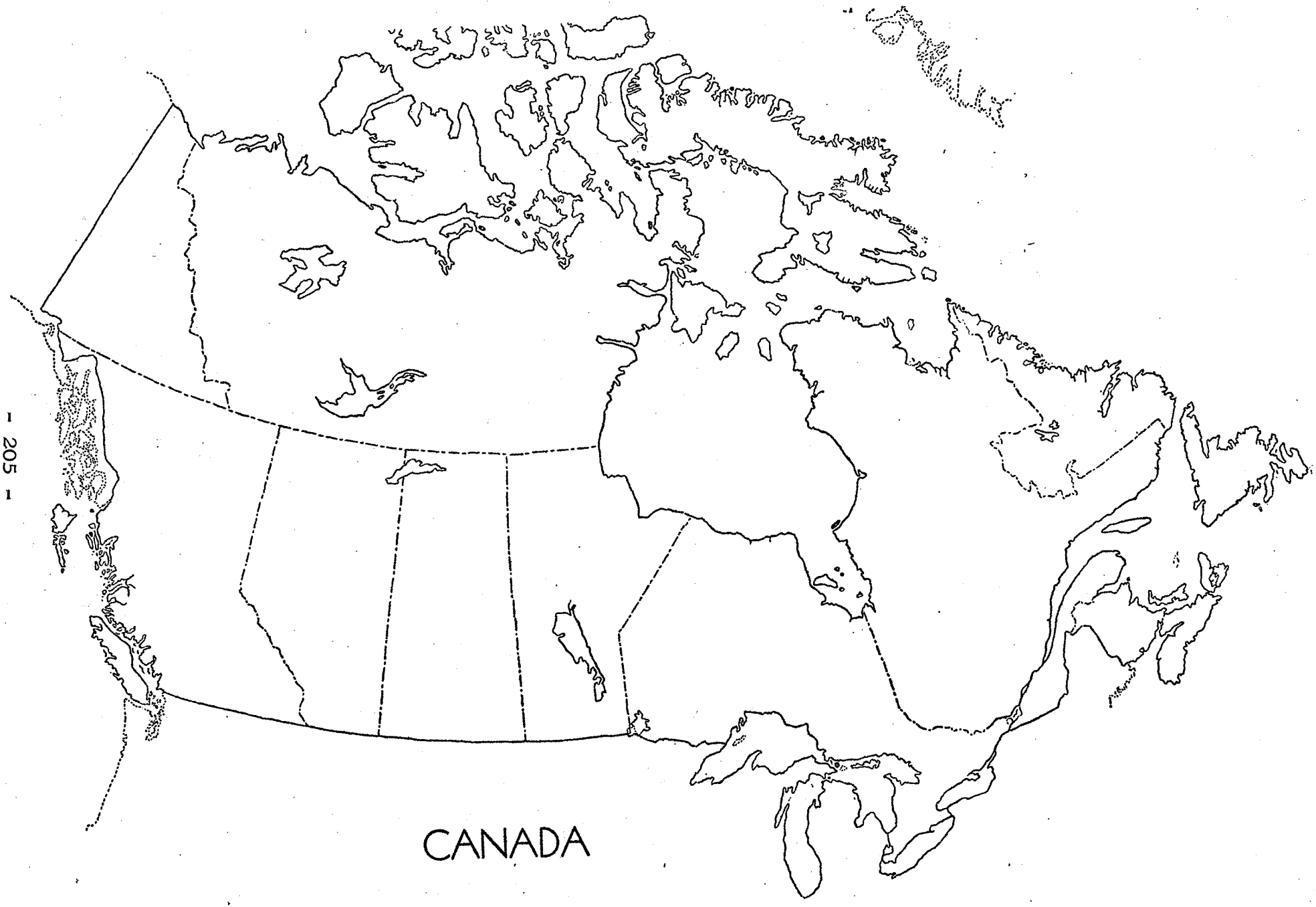
---

SECTION A

(Candidates will do ALL of Section A)

Values

1. On the outline map provided:


CANADA

$7x\frac{1}{2}$ (a) Mark with a dot (.) and name: the Capital of Canada, Cumberland House, Fort Beausejour, Sault Ste. Marie, Stadacona, Fort Chipewyan, Victoria.

$9x\frac{1}{2}$ (b) Locate and print the names of: Strait of Juan de Fuca, Gaspé, Lake Huron, Bay of Fundy, Columbia River, Rainy Lake, Alaska Panhandle, Richelieu River, Coppermine River.

$\frac{1}{2}$ (c) Name and shade thus //// the Grand Banks of Newfoundland.

$\frac{1}{2}$ (d) Mark thus ═══ and name the Grand Portage.

1 (e) Mark thus xxxxxx the La Verendrye journeying from about Fort La Reine into the Mandan Country.

4 2. Rearrange the events in the following list so as to place them in the order in which they actually happened:

(a) Defeat of Laurier on the Reciprocity issue.
(b) General Arnold gives up his attempt to capture Quebec.
(c) Organizing of the Royal North West Mounted Police.
(d) Formation of the Company of One Hundred Associates.
(e) Building of the first steamboat in British North America.
(f) Signing of the Rebellion Losses Bill.
(g) Newfoundland becomes a Canadian province.
(h) Founding of the city of Halifax.

6x1 3. Briefly identify SIX of the following:
(a) The Canadian Shield
(b) The Pacific Scandal
(c) John and Sebastian Cabot
(d) General Murray
(e) The Clergy Reserves
(f) The Commonwealth Air Training Plan
(g) The Rush-Bagot Treaty
(h) Henri Bourassa

## SECTION B

(Answer ONE question from Section B)

16 4. Settlement, exploration, trading and Christian education were the principal activities of French rule in North America. Describe the development of these activities showing to what extent they were linked with one another.

16 5. Laval, Talon and Montcalm were men of great importance in New France. Describe in some detail what these men did to earn this recognition.

## SECTION C

(Answer ONE question from Section C)

5 6.(a) Explain how the coming of the United Empire Loyalists was of great importance to British America. (Limit your answer to the earlier years.)

5 (b) Explain the causes of the War of 1812-14.

6 (c) Describe the causes and the results of the great migration to British North America, 1815-1850.

7. Lord Selkirk and his Red River Settlement occupy an important position in the history of Manitoba and Western Canada.

6 (a) Give an account of the beginning of the Settlement.

2 (b) Why was the North West Company more hostile to the Settlement than was the Hudson's Bay Company?

5 (c) Tell why and how the Metis resisted the Settlement.

3 (d) Describe briefly Lord Selkirk's part in the drama during the last few years of his life.

## SECTION D

(Answer ONE question from Section D)

16 8. "Durham's Report is one of the greatest state

papers in the English language." Picture the circumstances causing the appointment of the Durham Commission, and describe carefully Durham's actions and thinking in the situation and the main features of his Report.

6 9. (a) Name FOUR outstanding "Fathers of Confederation" and indicate briefly the particular contribution each made to the cause of Confederation.

6 (b) List and explain the most important reasons making Confederation appear desirable.

4 (c) Outline the division of powers between the federal and the provincial governments as set out in the B.N.A. Act.

## SECTION E

(Answer ONE question from Section E)

16 10. Trace the development of communications in Canada in the areas of Railways, Highways, and Airways.

4 11. (a) Account for the formation of new political parties in "the 1930's."

4 (b) What were the important recommendations of the Rowell-Sirois Report?

4x2 (c) List and write a brief note on FOUR different examples of Social Security to be found in Canada.

## SECTION F

(Answer ONE question from Section F)

8x2 12. Explain clearly the meaning of any EIGHT of the following items:
Budget; Order-in-Council; Canadian High Commissioner; Cabinet Responsibility; Prorogation versus Dissolution; Returning Officer; Oath of Allegiance; Executive Branch of Government; Democracy in Local Government; Social Legislation; Political Deadlock.

1 13. (a) Name the organization that has established these, among other agencies: WHO, UNESCO and ILQ.

2 (b) How many of the following offences are tried in Canada by criminal law: hunting out of season, burning a neighbor's haystack, murder, theft.

1 (c) Explain the term Civil Service.

1 (d) Which of these Departments may be in both federal and provincial governments: Agriculture, Labor, Education, Defence.

1 (e) What is a Sessional Indemnity?

1 (f) How are Canadian Senators appointed?

2 (g) What is the Speech from the Throne?

2 (h) What is the role of the Opposition in Parliament?

3 (i) List 3 general conditions which entitle a person to vote in Canadian elections.

1 (j) What is an indirect tax?

1 (k) Is Manitoba's legislature bicameral?

Paper No. 24

HIGH SCHOOL EXAMINATION BOARD OF MANITOBA

(Representing Department of Education
and University of Manitoba)

---

EXAMINATIONS, JUNE, 1961

---

GRADE XI MATHEMATICS
(ALGEBRA AND GEOMETRY)

Wednesday, June 28th, 9.00 to 12.00 a.m.

Examiners: A. Giesinger, J.C. Stewart, J.L. Wright, F. Zeiler

---

IMPORTANT: All rough work must be done in the answer booklet.

---

PART A - ALGEBRA

Values

1 1. (a) Remove brackets and collect like terms:

$$-2[3-a(2b-a) + (a+b)(2a-3b)]$$

2 (b) Evaluate $\frac{3x - 2y}{(x-y)^3}$ when $x = -2$, $y = 3$.

2. Factor completely:

3 (a) $x^4-x^3+8x-8$

2 (b) $9a^2+4bc-4c^2-b^2$

3 (c) $m^3-4m^2+m+6$

3. Simplify:

4 (a) $\frac{1}{x^2+3xy} + \frac{2}{9y^2-x^2} - \frac{2}{x^2-6xy+9y^2}$

4 (b) $\frac{a^3-8b^3}{2a^2-2ab-12b^2} \cdot \frac{a^2+4ab+4b^2}{a^2-4b^2} \div \frac{a^2b+2ab^2+4b^3}{a^2-5ab+6b^2}$

4. Simplify:

2 (a) $27^{\frac{2}{3}} + 36^{-\frac{1}{2}} - 4(5)^0$.

2 (b) $\left(\frac{9a^4}{16b^{-6}}\right)^{-\frac{3}{2}}$

2 (c) $3\sqrt{72} - 2\sqrt{128} + 3\sqrt{200}$

3 (d) $\frac{2\sqrt{6}-3}{\sqrt{3}-\sqrt{2}}$, (by rationalizing the denominator).

3 5. (a) Solve for x: $x(x+3)=\frac{3}{4}$

3 (b) Solve for x and y:

$$\frac{9}{x} - \frac{4}{y} = 8$$

$$\frac{13}{x} + \frac{7}{y} = 101$$

4 (c) Solve the general quadratic equation

$$ax^2+bx+c=0$$

for x by completing the square.

3 6. Find the square root of:

$$x^4-6x^3+17x^2-24x+16$$

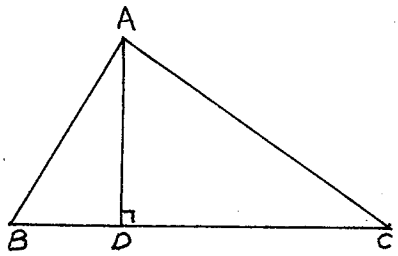
4 7. Solve graphically for x: $x^2-2x-8=0$

5 8. A jeweller bought a number of watches for $200. He sold all but 5 of the watches for $180., gaining $2. on each watch sold. How many watches did he buy?

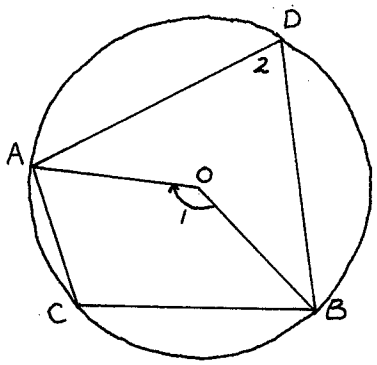
## PART B--GEOMETRY

Note: In Questions 1, 2 and 3 it is not necessary to make the diagrams, nor to state what is given and required. But you must make clear by a few statements and reasons how you arrive at your answers.

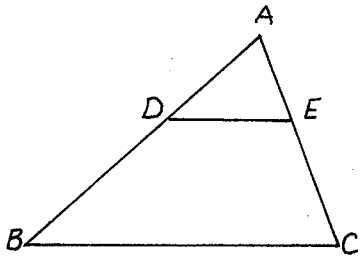
1. In $\triangle$ ABC, AD $\perp$ BC
AC = 20 units
BC = 24 units
DC = 16 units
Find:
2 (a) the length of AD
2 (b) the area of $\triangle$ ABD




3 2. $\angle$ 1 = (x+10) degrees.
$\angle$ ACB = 110 degrees.
Find x.

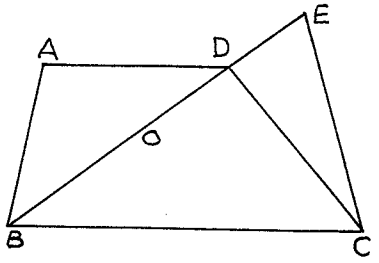



3 3. In $\triangle$ ABC, DE // BC.
AD = 3 units.
DB = 5 units.
DE = x units.
BC = (x+4) units.
Find the length of BC.



5 4. In quadrilateral ABCD, AD is parallel to BC. Diagonals AC and BD intersect at O. BD is produced to E so that OD = DE.

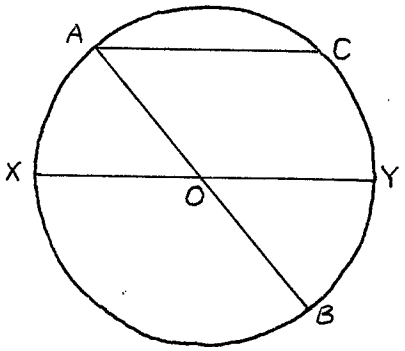
Prove $\triangle BOA = \triangle CDE$




5 5. In circle with centre O, chord AC is parallel to diameter XOY. AOB is a diameter.

Prove:

arc CY = arc YB.




5 6. Draw a circle of given radius r to pass through a given point P and to touch a given straight line AB. Describe your construction, but omit the proof.

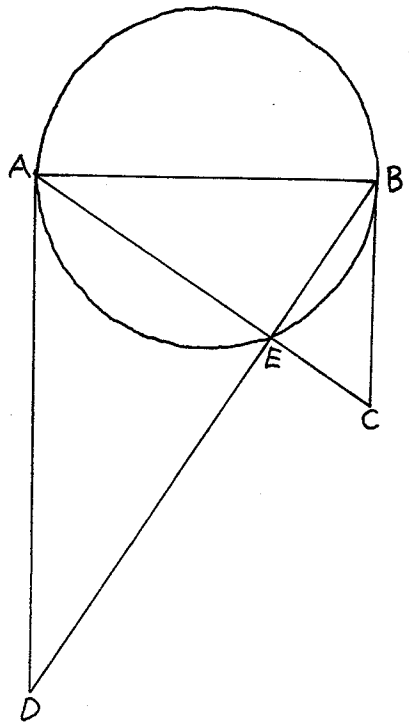
7 7. Prove the following theorems:

(a) The angles between a tangent to a circle and a chord drawn from the point of contact are equal respectively to the angles in the alternate segments.

6 (b) If a line cuts two sides of a triangle proportionally, it is parallel to the third side.

6 8. AB is a diameter.
AD and BC are tangents.
AC and BD are straight lines intersecting at E on the circumference.

Prove $\frac{AD}{AB} = \frac{AB}{BC}$




6 9. From B, tangents are drawn to a circle with centre O, meeting it at A and C respectively. AC, OA, and OC are joined.

Prove $\angle AOC$ is twice the size of $\angle BAC$.
(i.e., $\angle AOC = 2 \angle BAC$.)

Paper No. 1

HIGH SCHOOL EXAMINATION BOARD OF MANITOBA

(Representing Department of Education
and University of Manitoba)

---

EXAMINATIONS, JUNE, 1961

---

GRADE XI CHEMISTRY

Wednesday, June 21st, 9.00 to 12.00 a.m.

Examiners: C. L. Connell, G. E. Dunn, C. A. Joyce

---

IMPORTANT - All rough work must be done in the answer booklet. Errors in English, Spelling and Arithmetic may be considered in the marking. Problems must be worked to a final answer and expressed in their proper units of measurement. The arithmetic involved in working problems should be clearly shown.

Atomic weights: aluminum 27, calcium 40, carbon 12, chlorine 35.5, hydrogen 1, nitrogen 14, oxygen 16, sulphur 32.

## SECTION I

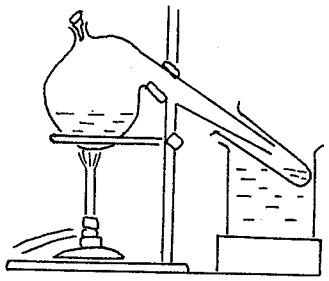
This section is to be detached and fastened firmly inside the answer booklet.

This year you have studied the following nine elements or compounds which are all prepared as gases.

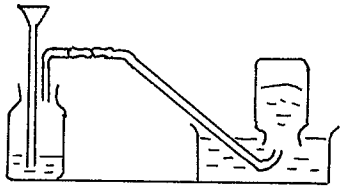
| | | | |
|---|---|---|---|
| $O_2$ | oxygen | $SO_2$ | sulphur dioxide |
| $H_2$ | hydrogen | $Cl_2$ | chlorine |
| $NH_3$ | ammonia | $CO_2$ | carbon dioxide |
| $H_2S$ | hydrogen sulphide | HCl | hydrogen chloride |
| $HNO_3$ | nitric acid | | |

All the questions in this section refer to the above gases. The answer to each question is to be written in the space indicated. Remember it will be the name or formula of one of the nine gases. Each answer is worth 1 mark.

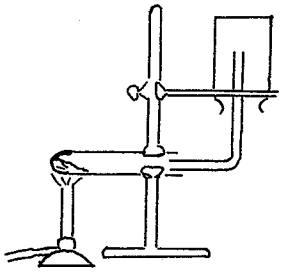
1. Which of the gases would be most suitably prepared by the methods illustrated?



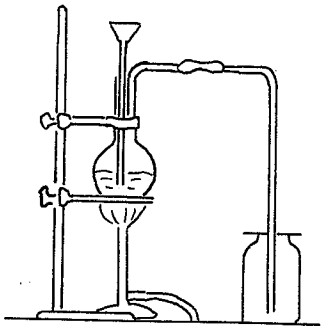
(a)_____



(b) _____



(c)_____



(d) _____

2. Which of the nine gases:
   (a) has the odor of burning matches _____
   (b) dissolves in water to form a weak base_____
   (c) is pale green or yellow in color _____
   (d) will reduce copper oxide to copper_____
   (e) forms ozone when an electric discharge is passed through it _____

(f) combines readily with the hydrogen in turpentine setting free carbon _____
(g) causes the tarnishing of silverware _____
(h) forms a strong binary acid in water solution _____

3. The following questions refer to a specific use of the gas.
(a) This gas is used in bleaching wood pulp _____
(b) A solution of this gas is used in making the familiar aniline dyes _____
(c) This gas is used to bleach cotton materials _____
(d) This gas is generally used to extinguish electrical fires _____
(e) This gas is used as a commercial refrigerant _____
(f) This gas is used in changing liquid fats to solids _____
(g) This gas is used in deseaming steel billets _____
(h) This gas is essential in the process of photo-synthesis _____

4. The following refer to tests used to identify some of the gases listed:
(a) the gas burns with a pale blue, almost colorless flame and the only product is water vapour _____
(b) a strip of filter paper moistened with lead acetate solution turns brownish-black in this gas _____
(c) a solution of this gas will give a brown ring when ferrous sulphate, then concentrated sulphuric acid are added _____
(d) if this gas is bubbled into lime water, a white precipitate is formed _____
(e) a glowing splinter will burst into flame in this gas _____

## SECTION II

This section to be answered in your booklet.

Values:

EITHER

6 1. On the basis of the kinetic theory, how are the following observations explained:

(a) gases have a lower density then solids or liquids.
(b) gases exert pressure on all sides of the container.
(c) a few drops of ink in a beaker of water will eventually color all the contents of the beaker.

OR

You have 2 test tubes; one containing a mixture of iron and sulphur, the other containing the substance produced when iron and sulphur are heated together. Describe 3 ways you could use these samples to show the difference between a mixture and a compound.

2. Draw atomic models for the following substances:

2 (a) water
3 (b) magnesium fluoride

| | Atomic Weight | Atomic Number |
|---|---|---|
| Mg | 24 | 12 |
| F | 19 | 9 |
| O | 16 | 8 |
| H | 1 | 1 |

3. (a) Write equations to illustrate:

2 (i) the reaction of water with a metal
2 (ii) the reaction of water with an oxide of a non metal.

3 (b) Briefly discuss how chemicals may assist in removing suspended matter from water. Use an equation to illustrate your discussion.

6 (c) These terms have reference to solutions and crystallization. Explain, with examples, what is meant by <u>four</u> of the following:

(i) homogeneous
(ii) emulsion
(iii) miscible
(iv) effervescence
(v) supersaturation
(vi) recrystallization

6 4. (a) Write balanced equations for the reactions below

(i) copper + chlorine $\longrightarrow$ cuprous chloride.
(ii) calcium oxide + phosphorous pentoxide $\longrightarrow$ calcium phosphate.

(iii) feric oxide + carbon monoxide ⟶ ferrous oxide + carbon dioxide.

8 (b) Write and balance the following equations which have to do with preparations and reactions you have studied this year. Do FOUR equations.

(i) a lab. preparation for hydrogen.
(ii) a metal such as zinc or copper is heated with concentrated sulphuric acid.
(iii) a solution of barium chloride is added to a solution of sodium sulphate.
(iv) a lab. preparation for chlorine (other than by electrolysis).
(v) formic acid is dropped slowly into hot concentrated sulphuric acid.

2 5. (a) Name the following salts:
$NaI$, $KClO_2$, $Ca(HCO_3)_2$, $NH_4C_2H_3O_2$.

2 (b) Name the salts in the following list which would be considered soluble in water:
silver nitrate; mercurous chloride, magnesium sulphate, calcium carbonate, sodium sulphide, barium sulphate, potassium acetate.

2 (c) How would you prepare insoluble ferric hydroxide from ferric nitrate?

3 (d) Give two general methods of preparing acids. Include an equation for each.

6 6. Define or explain any four of the following. Give an example to illustrate each: adsorption, destructive distillation, allotropy, hydrogenation, isotope.

5 7. Describe fully one of the following:
(a) the contact process for making sulphuric acid.
(b) the manufacture of silicon carbide in the electric furnace.
(c) the Frasch process for mining sulphur.

2 8. (a) What is the weight of 1 litre of hydrogen sulphide ($H_2S$) at S.T.P.?

2 (b) What is the percentage of nitrogen in ammonium nitrate ($NH_4NO_3$)?

3 (c) A compound has the following percentage composition: calcium 29.5%, sulphur 23.5%, the balance being oxygen. What is its simplest formula?

9. $2Al + 6HCl \longrightarrow 3H_2 + 2AlCl_3$

3 (a) What weight of aluminum chloride would be produced by the action of excess hydrochloric acid on 13.5 grams of aluminum according to the above equation?

2 (b) What would be the volume of hydrogen produced at S.T.P. by using 13.5 g. of aluminum?

10. Ethane gas burns in oxygen according to this equation:

$$2C_2H_6 + 7O_2 \longrightarrow 4CO_2 + 6H_2O$$

2 (a) What volume of oxygen at $20^{\circ}$ C. and 740 mm. pressure is needed to burn 40 litres of ethane at the same temperature and pressure?

3 (b) 91 litres of $CO_2$ was originally measured at S.T.P. What will be the new volume at a temperature of $127^{\circ}$ C. and a pressure of 200 mm. of Hg.? You are required to calculate the answer.

Paper No. 5

HIGH SCHOOL EXAMINATION BOARD OF MANITOBA

(Representing Department of Education
and University of Manitoba)

---

EXAMINATIONS, JUNE, 1961

---

GRADE XI PHYSICS

Thursday, June 22nd, 9.00 to 12.00 a.m.

Examiners: R. D. Connor, S. H. Doctoroff, W. G. Frazer

---

Important - All rough work must be done in the answer booklet.

THERE ARE 34 QUESTIONS TO BE ANSWERED ON THIS PAPER.

## SECTION I

Section I is to be detached and fastened to your answer booklet. Fill in the blanks in the following statements.

Value: Questions 1-17, 1 mark each; 18-21, 2 marks each.

1. That region of the atmosphere which has an almost uniform temperature is known as the _____

2. 100 cubic centimeters of aluminum weigh 154 grams in water. Its weight in air would be _____grams.

3. 500 cubic centimeters of dry gas under a pressure of 2500 grams per square centimeter change to _____ cubic centimeters at a pressure of 2000 grams per square centimeter.

4. The process of purifying water by boiling it and condensing its vapor is called _____

5. An increase in pressure _____ the freezing point of ice.

6. The quantity of thermal energy possessed by a particular body determines its _____

7. In a certain city in a given month the high and low temperatures differed by 22.5 centigrade degrees. This corresponded to a difference of _____ fahrenheit degrees.

8. $360^{\circ}$ C. = _____ $^{\circ}$ F.

9. The dew point is defined as _____
_____

10. The ratio of the wave length of a closed pipe to that of an open pipe of the same length is _____

11. A string 20 inches long vibrates 360 times per second. A similar string 15 inches long having the same tension will vibrate _____ times per second.

12. The octave above a note whose frequency is 320 vibrations per second has a frequency of _____vibrations per second.

13. The speed of sound in air at $15^{\circ}$ C. is ____feet per second.

14. A piece of soft iron placed in a magnetic field has a greater concentration of magnetic lines of force than its surroundings because the soft iron has a higher _____

15. If a piece of steel is stroked from left to right with the south pole of a permanent magnet, the right-hand end of the piece of steel will become a _____pole.

16. Substances through which electrons pass freely are called _____

17. When charging a body, only the _____ particles of electricity move.

18. One cubic centimeter of limestone weighs 2.7 grams. 10 cubic feet of limestone weighs _____pounds. (Show your work.)

19. An object weighs 20 grams in air and 15 grams when submerged in water. Its weight in alcohol (S.G.=0.8) would be _____grams. (Show your work).

20. A string under a tension of 20 pounds vibrates 360 times per second. A string similar in all respects will vibrate 180 times per second if the tension is _____ pounds. (Show your work.)

21. The shape of the magnetic field surrounding a wire carrying a current consists of _____ in a plane _____ to the wire carrying the current.

## SECTION II

Values

2 22. (a) State Archimedes' Principle.

3 (b) A wooden box 20 centimeters long and 10 centimeters wide, open at the top is floating in water. When a kilogram weight is put into the box, the water line is 7 centimeters from the bottom of the box. What is the weight of the box?

3 (c) A cement block 6 feet by 6 feet by 6 feet rests at the bottom of a lake, 20 feet deep. Find the total force exerted by the water on one of the vertical sides.

3 23. (a) Using a labelled diagram describe how you would make a simple barometer.

4 (b) Using a diagram explain how a liquid may be transferred by means of a siphon. Explain in terms of net pressure why the siphon works.

24. The diameters of the pistons in a hydraulic press are 20 inches and 1 inch.

4 (a) What must be the force on the small piston if a force of 5 tons is to be exerted by the large piston?

2 (b) If the small piston moves one foot, how far does the large piston move?

2 25. (a) Why does a bi-metallic strip bend when its temperature is changed?

2 (b) Explain briefly one application of this effect.

6 26. Find the heat of vaporization of water from the following data:

| | |
|---|---|
| S.H. of calorimeter | 0.1 |
| Weight of inner can of calorimeter | 126.2 grams |
| Weight of inner can + cold water | 270.6 grams |
| Temperature of cold water | 8.5° C. |
| Temperature after passage of steam | 36.9° C. |
| Temperature of the steam | 100° C. |
| Weight of inner can plus water at the end of experiment | 277.9 grams |

3 27. (a) Explain fully how the vacuum bottle is constructed to prevent loss of heat.

3 (b) Define: British Thermal Unit, Heat of Fusion of a substance, sublimation.

3 (c) When 55 grams of marble at 95° C. is dropped into 220 grams of water at 17° C. the final temperature was 23° C. Neglecting the mass of the container, find the specific heat of marble.

4 28. Every musical tone has 3 characteristics that distinguish it from other musical tones.
(a) Name these 3 characteristics.
(b) Upon what does each depend?

29. A tuning fork produces resonance when held over a closed tube 7.95 inches long, and 2 inches in diameter.
3 (a) What is the wave length of the sound?
2 (b) If the frequency of the tuning fork is 384 vibrations per second what is the speed of sound in the air?

2 30. (a) Two bar magnets are placed in line with the north pole of one and the south pole of the other facing each other. Sketch neatly the magnetic field.

2 (b) State two proporties of these lines of force.

5 31. Describe briefly an electrophorus. Explain in terms of electron movement and with accompanying diagrams how it may be used to provide a supply of electrical charge.

2 32. (a) Make a labelled diagram of an electric bell.

3 (b) Describe clearly and fully its operation.

33. Answer ANY TWO of the following parts:

2x3 (a) Explain how beats are produced.

(b) What evidence have we that the absolute zero is $-273^{o}$ C.?

(c) Given a centigrade thermometer how would you check that it reads correctly at the fixed points?

2x3 34. Answer ANY TWO of the following parts:

(a) Why may a small rubber balloon containing a mixture of hydrogen and air remain floating in mid-air in a room?

(b) How would you show that water is a poor conductor of heat? Provide a diagram to illustrate your answer.

(c) A bubble of marsh gas (methane) at the bottom of a pond has a volume of 0.5 cubic inches. When it rises to the surface it has a volume of 0.85 cubic inches. What is the depth of the pond?

Paper No. 18

HIGH SCHOOL EXAMINATION BOARD OF MANITOBA

(Representing Department of Education
and University of Manitoba)

---

EXAMINATIONS, June, 1961

---

GRADE XI FRENCH

---

Tuesday, June 27th, 9.00 to 12.00 a.m.

Examiners: G. Chauvière, Sr. de Moissac, C. M. Jones, Sr. Luce-Marie, E. M. MacKay, M. E. J. Richard

---

NOTE: The Examiners will always take into account the correctness and quality of the English you use. This applies particularly to your translations from French.

---

IMPORTANT: All rough work must be done in the answer booklet.

---

Values

5 1. Répondez en français à chacune des questions suivantes. Employez toujours des phrases complètes:

(a) A quelle heure êtes-vous arrivé(e) à l'école aujourd'hui?

(b) Ecrivez en toutes lettres: Sunday, June 4, 1961.
(c) Pourquoi Michel Lesage travaille-t-il plus que vous au lycée?
(d) Comment allez-vous rentrer chez vous après cet examen?
(e) Que faut-il avoir pour acheter une automobile?

7 2. Complétez les phrases suivantes en traduisant en français les mots entre parenthèses. Recopiez les phrases et soulignez les mots que vous avez traduits ou changés:

(a) Il est bien plus grand que (I).
(b) Marie chante (better) que Jean.
(c) Il est content que vous (are going).
(d) Apprenez (all) qui est dans votre livre.
(e) Quelle histoire! (Tell them it.)
(f) Ils (had just) chanter.
(g) (Nobody) est venu me voir.
(h) Je les verrai quand ils (come).
(i) Il veut que je (do) mes devoirs.
(j) Nous avons mangé les gâteaux (which) je (had bought).
(k) Il sait (what) vous avez besoin.
(l) J'ai vu la maison (in which) je suis né.

4 3. Ecrivez en français les verbes suivants:

| | |
|---|---|
| Let us eat | Will he receive? |
| She had stayed | He will go |
| They used to finish | They are not hoping |
| Get up! (singular) | She would be able |

24 4. Traduisez en français:

Marie and I had left the farm early and we soon arrived in Quebec. "What an interesting city," said Marie. "I shall be glad to stay here for a few days. Michelle Duval, whom you have met, has invited us for lunch. But first I want to buy something."

We went into a big store and Marie bought a beautiful white dress. I said to her: "That suits you very well, but what will your mother say if you spend all your money?"

Marie replied: "Everything is less expensive here than

in the village, and, of course, I need a new dress." We went out of the store and walked directly to the Duval's house. My friend said: "Do you see that big church on the other side of the street? Michelle's family and her friends generally go there on Sundays. Would you like to come with me?"

"Certainly, Marie. Oh, here is Michelle's house, and there she is, looking through the window!"

16 5. Ecrivez en français une composition sur UN des sujets suivants (environ 150 mots). Ecrivez directement en français.

(a) Une journée dans la vie d'un professeur d'école.

(b) Faites une description du Canada français.

(c) Le journal annonce: "Un(e) de nos jeunes élèves a sauvé la vie d'une personne en danger." Racontez cette action comme si vous en étiez le héros (l'héroine).

(d) Faites le portrait du surveillant (de la surveillante--the supervisor) dans votre salle d'examen.

10 6. Traduisez en bon anglais:

Un léger bruit lui fit soudain tourner la tête, et elle aperçut quatre hommes et quatre canons de revolvers braqués sur elle. Elle lut dans les yeux des bandits une froide décision et une dureté impitoyable. Elle était brave. Son premier geste fut d'étendre la main pour saisir un Colt qui se trouvait près de l'appareil télégraphique, mais elle n'en eut pas le temps. Le chef de la bande était déjà placé entre elle et la table.

Plaçant son arme à deux doigts du front de la jeune fille, il lui dit bas, mais nettement: "Un mouvement de plus, et je tire." Et empochant vivement le Colt, il ajouta moqueur: "Ce joujou est trop dangereux pour une jeune personne comme vous. Nous ne vous ferons pas de mal, excepté si vous nous y forcez."

9 7. Répondez en français à TROIS des questions suivantes basées sur les textes que vous avez lus. Ecrivez environ 25 mots sur chacune des questions que vous choisirez. Ne comptez pas les mots de la question elle-même.

(a) Comment le rêve de Francinette s'est-il réalisé?

(b) Qu'est-ce que Jacques Cartier a fait quand il est arrivé à Gaspé?

(c) Comment se passe le Jour de l'An dans la famille Lesage?

(d) Qu'est-ce qui a suggéré à Noël l'invention des skis?

8 8. Répondez en anglais aux questions suivantes. Employez toujours des phrases complètes.

(a) Who was the first Canadian farmer? What made his lot so hard?

(b) What three methods of travel did Napoléon Tremblay use? What was the purpose of his trip?

(c) The French language brought to Canada in the XVIIth and XVIIIth centuries became in Canada a greatly improved and unified language. Explain how this came about.

(d) Explain or identify any four of the following; one good sentence about each one:

| | |
|---|---|
| les lauréats des compositions | emploi du temps |
| l'Arc de Triomphe | le Roi Soleil |
| le Panthéon | un divertissement |
| la table d'orientation | |

17 9. Traduisez en bon anglais:

Ce fut ma nièce qui alla ouvrir quand on frappa. Elle venait de me servir mon café, comme chaque soir (le café me fait dormir). J'étais assis au fond de la pièce, relativement dans l'ombre. La porte donne sur le jardin. Autour de la maison court un trottoir de planches de bois très commode quand il pleut. Nous entendîmes le bruit des pas sur les planches. Ma nièce me regarda et posa sa tasse. Je gardai la mienne dans mes mains.

Il faisait nuit, pas très froid: ce novembre-là ne fut pas très froid. Je vis l'immense silhouette, la casquette plate d'un officier allemand, le manteau jeté sur les épaules.

Ma nièce avait ouvert la porte et restait silencieuse; elle se tenait contre le mur, sans rien regarder. L'officier, qui entra, se tourna vers ma nièce et sourit discrètement.

# APPENDIX E

## BEHAVIOUR DESCRIPTION CHART AND SCORE SHEETS

APPENDIX E

Excerpt from Letter

---

University of Chicago
Committee on Human Development

QUINCY YOUTH DEVELOPMENT PROJECT
Quincy, Illinois

June 7, 1961.

Miss Naomi Hersom
606 Rathgar Avenue
Winnipeg 13, Manitoba
Canada

Dear Miss Hersom:

.....

I am enclosing the scoring sheets and a set of norms developed here for the Behavior Description Chart. On each group of five items the last two are presumably typical of average children and therefore not scored. On the first five items, item A is the leadership item, item B the aggressive item and item C the withdrawn item, as can be seen on the scoring sheet, whereas the leadership item on the second pentad is item C, etc. On the scoring sheet, if leadership is chosen as a most like item by the teacher a check is put over the letter A above arabic one. If leadership were the least like item in the teacher's opinion a check would be made to the right of A in the open space between A and C on the scoring sheet. After the most and least like items have been checked on all ten pentads, the number of most like are added up and put in the lower right hand corner and also the number of least like leadership, withdrawn and aggressive items. In order to keep all numbers positive we added ten to each score. In other words if someone had one most like leadership score and 5 times leadership was checked as least like we added 10 to the one, making it 11 minus 5 or a total leadership score of six. Therefore leadership scores can range from 0 for the child who had least like leadership every time to 20 for the child who had most like leadership checked every time and could

therefore not have least like leadership checked at all. This means that the child who has three leadership items checked as most like and three checked as least like has a score of 10, the same as a child who has no leadership items checked as most or least like. I think we did not use the combined scores column in later years.

The frequency distribution which I included on the fourth page of the enclosed material on the BDC is just included as a sample distribution. It should not be considered normative.

.....

Sincerely yours,

"Gordon P. Liddle"

Assistant Professor

BEHAVIOR DESCRIPTION CHART

Directions: In each of the sets of descriptive statements below, pick out two statements. (1) Pick out that statement which you find fits the pupil most aptly - the one which the pupil is most like. (2) Then pick out the statement which the pupil is least like. Place the letters of these statements on the record sheet under the number corresponding to the set of statements. Do not be concerned if the statement does not apply exactly, and do not dwell too long upon your decision. Go through the entire chart for one pupil at a time. Experience shows that the ratings can be completed in just a few minutes per pupil.

---

1. A. Others come to him for help
   B. Causes disturbances
   C. Lacks confidence in himself
   D. Doesn't go along with those who break the rules
   E. Shows emotions, but in a restrained way

2. A. Other people find it hard to get along with him
   B. Is easily confused
   C. Other people are eager to be near him or on his side.
   D. Is usually willing to go along with the group
   E. Interested in other people's opinions and activities.

3. A. Sensitive, touchy, hurt by criticism
   B. Shows off, attention getter
   C. Is self-confident
   D. Enjoys being a part of the group without taking the lead
   E. Dislikes criticism

4. A. Is extremely quiet and passive
   B. Is a natural leader
   C. Is boastful
   D. Does his share, but does not seek leadership
   E. Finds excuses when his work is not done

5. A. Frequently gets into fights or heated arguments
   B. Exerts a good influence on the class
   C. Seems anxious and fearful

D. Is sometimes critical of other people
E. Is generous when in the mood

6. A. Makes sensible, practical plans
B. Breaks rules frequently
C. Becomes discouraged easily
D. Usually willing to share with others
E. Doesn't rub people the wrong way

7. A. Takes an active part in group projects and other activities
B. Is shy and retiring
C. Others cannot work with him
D. Polite
E. Occasionally contributes to a discussion

8. A. Quarrelsome
B. Is tense or ill at ease when reciting or appearing before a group
C. Likes jobs which give him responsibility
D. Is quiet and seems content with himself
E. Enjoys a conversation

9. A. His presence or absence is not noticed by other students.
B. Figures out things for himself
C. Is impulsive and easily excited
D. Is a good follower
E. Is usually courteous to other people

10. A. Tries to bully and domineer over others
B. Is quick to see valuable things in other people's suggestions
C. Is hard to get to know
D. Is boisterous
E. Pleasant to talk with but seldom initiates a conversation

BEHAVIOR DESCRIPTION CHART - RECORD SHEET

Q.Y.D.C.
N.McC.
1-55

Name of Rater _____

Group _____

Date _____

M: Most Like
L: Least Like

Set Numbers

| Name of Pupil | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | L | M | L | M | L | M | L | M | L | M | L | M | L | M | L | M | L | M | L |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |

5-9-1957

Name _____ School _____ Age Group _____

Quincy Youth Development Commission

Behavior Description Chart Score Sheet

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leadership | A | | C | | C | | B | | B | | A | | A | | C | | B | | B | |
| Withdrawn | C | | B | | A | | A | | C | | C | | B | | B | | A | | C | |
| Aggressive | B | | A | | B | | C | | A | | B | | C | | A | | C | | A | |
| | M | L | M | L | M | L | M | L | M | L | M | L | M | L | M | L | M | L | M | L |
| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | |

| Adjusted Score | Combined Score | Most Like | Least Like |
|---|---|---|---|
| Le - | Le - | Le - | Le - |
| Wi - | Wi - | Wi - | Wi - |
| Ag - | Ag - | Ag - | Ag - |

In scoring the Behavior Description Chart, items D and E are throw-away items, that is, they are not scored for any of the 10. It is assumed that they could be true of an individual without making him either aggressive, withdrawn, or a leader.

The teacher picks out the one of the five items of the pentad that he or she thinks is most typical of the individual being rated. She also picks out the least typical or the least-like item. The leadership score is arrived at by adding the number of most like leadership items, and subtracting from this the number of least like leadership items. The withdrawn and aggressive scores are arrived at in a similar fashion.

Following this, we made a frequency distribution of all the individuals in this age group who have been rated by their teachers, and from this frequency distribution, standard scores were figured. Percentile scores could also be figured.

When we used the Behavior Description Chart with a group of 445 ninth grade students in April, of 1957, we got the following frequency distributions.

## LEADERSHIP

| Raw Score | Frequency | Percentile | T-Score |
|---|---|---|---|
| 20 | 22 | 98 | 83 |
| 19 | 28 | 92 | 79 |
| 18 | 22 | 86 | 75 |
| 17 | 17 | 82 | 72 |
| 16 | 18 | 78 | 68 |
| 15 | 16 | 74 | 64 |
| 14 | 25 | 70 | 60 |
| 13 | 30 | 63 | 56 |
| 12 | 24 | 57 | 53 |
| 11 | 34 | 51 | 49 |
| 10 | 32 | 43 | 45 |
| 9 | 25 | 37 | 41 |
| 8 | 40 | 30 | 38 |
| 7 | 26 | 22 | 34 |
| 6 | 26 | 16 | 30 |
| 5 | 23 | 11 | 26 |
| 4 | 14 | 7 | 23 |
| 3 | 17 | 3 | 19 |
| 2 | 4 | 1 | 15 |
| 1 | 1 | 0 | 11 |
| 0 | 1 | 0 | 8 |

(M--11.28
SD--2.66)

## WITHDRAWNNESS

| Raw Score | Frequency | Percentile | T-Score |
|---|---|---|---|
| 20 | 2 | 100 | 91 |
| 19 | 5 | 99 | 87 |
| 18 | 12 | 97 | 83 |
| 17 | 16 | 94 | 79 |
| 16 | 19 | 90 | 74 |
| 15 | 13 | 86 | 70 |
| 14 | 19 | 83 | 66 |
| 13 | 21 | 78 | 62 |
| 12 | 39 | 72 | 57 |
| 11 | 39 | 63 | 53 |
| 10 | 64 | 51 | 49 |
| 9 | 63 | 37 | 45 |
| 8 | 38 | 26 | 40 |
| 7 | 26 | 18 | 36 |
| 6 | 21 | 13 | 32 |
| 5 | 22 | 8 | 28 |
| 4 | 14 | 4 | 23 |
| 3 | 5 | 2 | 19 |
| 2 | 6 | 1 | 15 |
| 1 | 1 | 0 | 11 |

(M--10.27
SD--2.36)

AGGRESSIVENESS

| Raw Score | Frequency | Percentile | T-Score |
|---|---|---|---|
| 20 | 0 | 100 | |
| 19 | 3 | 100 | 101 |
| 18 | 3 | 99 | 97 |
| 17 | 5 | 98 | 94 |
| 16 | 3 | 97 | 90 |
| 15 | 6 | 96 | 86 |
| 14 | 12 | 94 | 82 |
| 13 | 13 | 91 | 78 |
| 12 | 13 | 88 | 75 |
| 11 | 8 | 86 | 71 |
| 10 | 22 | 83 | 67 |
| 9 | 16 | 78 | 63 |
| 8 | 20 | 74 | 59 |
| 7 | 20 | 70 | 56 |
| 6 | 42 | 63 | 52 |
| 5 | 30 | 55 | 48 |
| 4 | 43 | 47 | 44 |
| 3 | 53 | 36 | 40 |
| 2 | 45 | 25 | 37 |
| 1 | 54 | 14 | 33 |
| 0 | 34 | 4 | 29 |
| | | (M--5.52 SD--2.63) | |

For some purposes you may want to break down the frequency distributions into a separate frequency distribution for boys and for girls.

# APPENDIX F

## TABLES OF RAW SCORES, STANDARD SCORES, AND SUMMARY STATISTICS RELATED TO ACHIEVEMENT SCORES

APPENDIX F

TABLE 13

MATCHED PAIRS IN MAJOR WORK AND CONTROL GROUPS

GRADE X, 1960

| Major Work | | | | | | Control | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pupil | Sex | Jr. High* School | C.A. in months | SCAT Total | Grade IX Average | Pupil | Sex | Jr. High* School | C.A. in months | SCAT Total | Grade IX Average |
| 1 | M | GW | 188 | 311 | 79 | 1 | M | GW | 188 | 311 | 80 |
| 2 | M | GW | 192 | 307 | 84 | 2 | M | GW | 190 | 307 | 84 |
| 3 | F | GW | 192 | 323 | 93 | 3 | F | GW | 190 | 303 | 58 |
| 4 | M | GW | 178 | 321 | 88 | 4 | M | GW | 182 | 303 | 65 |
| 5 | F | M | 185 | 299 | 73 | 5 | F | M | 196 | 299 | 64 |
| 6 | F | M | 188 | 301 | 64 | 6 | F | M | 178 | 297 | 81 |
| 7 | M | M | 184 | 293 | 63 | 7 | M | M | 188 | 293 | 91 |
| 8 | M | M | 185 | 301 | 73 | 8 | M | M | 186 | 305 | 89 |
| 9 | M | M | 180 | 319 | 79 | 9 | M | M | 183 | 311 | 73 |
| 10 | M | M | 184 | 295 | 84 | 10 | M | M | 184 | 297 | 64 |
| 11 | M | RH | 183 | 297 | 67 | 11 | M | RH | 187 | 297 | 76 |
| 12 | M | RH | 183 | 321 | 76 | 12 | M | RH | 189 | 313 | 88 |
| 13 | M | RH | 173 | 327 | 79 | 13 | M | RH | 186 | 311 | 85 |
| 14 | F | RH | 174 | 305 | 80 | 14 | F | RH | 185 | 301 | 93 |
| 15 | M | RH | 191 | 301 | 77 | 15 | M | RH | 182 | 307 | 83 |
| 16 | M | RH | 185 | 301 | 82 | 16 | M | RH | 184 | 301 | 81 |
| 17 | M | RH | 193 | 307 | 86 | 17 | M | RH | 186 | 307 | 81 |
| 18 | M | RH | 184 | 297 | 83 | 18 | M | RH | 190 | 297 | 79 |
| 19 | M | RH | 174 | 303 | 64 | 19 | M | RH | 175 | 303 | 84 |
| 20 | F | RH | 186 | 307 | 78 | 20 | F | RH | 184 | 311 | 83 |
| 21 | M | RH | 182 | 309 | 86 | 21 | M | RH | 183 | 309 | 86 |
| 22 | F | RH | 183 | 303 | 74 | 22 | F | RH | 184 | 303 | 87 |
| 23 | F | RH | 183 | 305 | 87 | 23 | F | RH | 187 | 307 | 80 |

*
GW = General Wolfe
M = Machray
RH = River Heights

TABLE 14

MATCHED PAIRS IN MAJOR WORK AND CONTROL GROUPS

GRADE X, 1961

| Major Work | | | | | | Control | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pupil | Sex | Jr. High School* | C.A. in months | SCAT Total | Grade IX Average | Pupil | Sex | Jr. High School* | C.A. in months | SCAT Total | Grade IX Average |
| 24 | F | M | 188 | 299 | 80 | 24 | F | HJM | 174 | 303 | 80 |
| 25 | M | M | 189 | 319 | 75 | 25 | M | St.J | 190 | 333 | 83 |
| 26 | M | M | 187 | 331 | 85 | 26 | M | L | 177 | 321 | 85 |
| 27 | M | M | 181 | 317 | 83 | 27 | M | IN | 187 | 311 | 85 |
| 28 | M | M | 190 | 311 | 82 | 28 | M | L | 189 | 317 | 88 |
| 29 | F | M | 183 | 309 | 82 | 29 | F | HJM | 185 | 359 | 90 |
| 30 | M | M | 183 | 309 | 82 | 30 | M | L | 188 | 303 | 87 |
| 31 | M | M | 191 | 305 | 68 | 31 | M | L | 188 | 303 | 90 |
| 32 | F | M | 189 | 299 | 83 | 32 | F | L | 183 | 299 | 84 |
| 33 | M | M | 189 | 297 | 83 | 33 | M | HJM | 180 | 299 | 75 |
| 34 | F | GW | 181 | 311 | 70 | 34 | F | SP | 182 | 303 | 83 |
| 35 | M | GW | 187 | 299 | 79 | 35 | M | GW | 181 | 303 | 86 |
| 36 | M | M | 180 | 295 | 72 | 36 | M | AM | 182 | 303 | 82 |
| 37 | F | GW | 179 | 295 | 71 | 37 | F | HJM | 185 | 295 | 93 |
| 38 | F | GW | 174 | 317 | 75 | 38 | F | SP | 180 | 321 | 83 |
| 39 | F | GW | 191 | 319 | 91 | 39 | F | GW | 192 | 370 | 93 |
| 40 | M | RH | 189 | 339 | 85 | 40 | M | RH | 190 | 303 | 71 |
| 41 | M | RH | 192 | 319 | 88 | 41 | M | RH | 186 | 321 | 85 |
| 42 | M | RH | 193 | 311 | 83 | 42 | M | RH | 193 | 309 | 67 |
| 43 | M | RH | 191 | 311 | 82 | 43 | M | RH | 184 | 311 | 77 |
| 44 | M | RH | 194 | 303 | 76 | 44 | M | RH | 203 | 303 | 73 |
| 45 | F | RH | 169 | 305 | 81 | 45 | F | RH | 175 | 305 | 82 |

*

HJM. = Hugh John Macdonald
St.J= St. John's
L = Luxton
IN = Isaac Newton
AM = Andrew Mynarski
SP = Sargent Park
GW = General Wolfe

TABLE 15

A SUMMARY OF THE RESULTS OF THE TESTS OF HOMOGENEITY OF VARIANCES

| | Major Work | | Control | | F |
|---|---|---|---|---|---|
| | N | $s^2$ | N | $s^2$ | |
| Chronological Age | 45 | 36.12 | 45 | 29.92 | 1.21 |
| Intelligence | 45 | 108.99 | 45 | 210.54 | 1.93 |
| Grade IX tests | 45 | 50.84 | 45 | 67.24 | 1.32 |
| Literature X | 45 | 42.12 | 45 | 49.00 | 1.16 |
| Composition X | 45 | 53.00 | 45 | 51.12 | 1.04 |
| Geography X | 45 | 32.60 | 45 | 42.64 | 1.31 |
| Mathematics X | 45 | 40.45 | 45 | 65.93 | 1.63 |
| Science X | 45 | 35.40 | 44 | 52.85 | 1.49 |
| French X | 44 | 35.17 | 45 | 68.89 | 1.96 |
| Average X | 45 | 22.47 | 45 | 30.91 | 1.38 |
| Literature XI | 23 | 36.72 | 23 | 57.31 | 1.56 |
| Composition XI | 23 | 22.66 | 23 | 25.91 | 1.14 |
| History XI | 23 | 53.58 | 23 | 29.92 | 1.78 |
| Mathematics XI | 23 | 80.64 | 22 | 66.10 | 1.22 |
| Chemistry XI | 23 | 30.47 | 22 | 29.16 | 1.04 |
| Physics XI | 19 | 41.35 | 18 | 30.25 | 1.37 |
| French XI | 23 | 72.42 | 22 | 77.26 | 1.07 |
| Average XI | 23 | 26.83 | 22 | 32.04 | 1.19 |
| Watson-Glaser Grade X | 21 | 31.11 | 22 | 52.68 | 1.69 |
| Watson-Glaser Grade XI | 22 | 73.87 | 19 | 48.36 | 1.53 |

TABLE 16

MEANS AND STANDARD DEVIATIONS FOR SIX GRADE X SUBJECTS IN SIX WINNIPEG HIGH SCHOOLS AT EASTER, 1960

| Subject | Daniel McIntyre | | Grant Park | | Gordon Bell | | Kelvin | | Saint John's | | Sisler | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | s | M | s | M | s | M | s | M | s | M | s |
| Literature | 68.30 | 13.61 | 63.90 | 13.66 | 62.61 | 11.62 | 62.19 | 14.71 | 60.51 | 16.54 | 54.19 | 16.75 |
| Composition | 63.23 | 13.37 | 59.72 | 12.84 | 64.32 | 10.14 | 66.49 | 11.44 | 65.57 | 11.15 | 59.29 | 12.66 |
| Geography | 66.97 | 12.57 | 69.75 | 12.23 | 66.08 | 12.91 | 69.81 | 12.24 | 68.48 | 15.55 | 65.53 | 14.04 |
| Mathematics | 63.80 | 22.57 | 63.30 | 23.62 | 48.48 | 22.05 | 70.05 | 18.87 | 63.44 | 21.52 | 54.57 | 20.72 |
| Science | 64.29 | 17.12 | 68.59 | 17.68 | 74.93 | 15.73 | 73.19 | 14.41 | 59.96 | 17.62 | 62.47 | 15.57 |
| French | 64.25 | 16.98 | 60.04 | 19.27 | 67.69 | 16.28 | 65.87 | 16.33 | 66.26 | 15.37 | 62.56 | 13.79 |

TABLE 17

MEANS AND STANDARD DEVIATIONS FOR SIX GRADE X SUBJECTS IN SIX WINNIPEG HIGH SCHOOLS AT EASTER, 1961

| Subject | Daniel McIntyre | | Grant Park | | Gordon Bell | | Kelvin | | Saint John's | | Sisler | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | s | M | s | M | s | M | s | M | s | M | s |
| Literature | 65.34 | 13.09 | 66.67 | 14.76 | 65.22 | 13.52 | 66.94 | 12.37 | 60.74 | 19.01 | 64.63 | 15.13 |
| Composition | 63.71 | 12.11 | 62.91 | 12.37 | 65.43 | 8.52 | 65.41 | 11.47 | 63.64 | 11.91 | 68.98 | 12.61 |
| Geography | 68.23 | 11.47 | 68.75 | 15.42 | 70.26 | 12.75 | 64.75 | 13.15 | 70.60 | 16.48 | 69.98 | 13.77 |
| Mathematics | 67.70 | 21.15 | 63.53 | 18.07 | 54.66 | 17.98 | 68.10 | 21.65 | 61.65 | 20.40 | 52.78 | 21.47 |
| Science | 64.01 | 16.05 | 70.94 | 17.40 | 71.42 | 15.05 | 62.12 | 14.38 | 63.13 | 17.79 | 66.20 | 14.73 |
| French | 66.60 | 16.33 | 64.39 | 19.47 | 69.67 | 14.80 | 63.79 | 19.16 | 59.57 | 18.03 | 56.34 | 15.00 |

TABLE 18

RAW SCORES FOR GRADE X EASTER EXAMINATIONS
MAJOR WORK GROUP

| Pupil | Lit. | Comp. | Geog. | Math. | Science | French |
|---|---|---|---|---|---|---|
| 1 | 74 | 62 | 85 | 73 | 88 | 81 |
| 2 | 96 | 85 | 84 | 96 | 93 | 86 |
| 3 | 97 | 89 | 94 | 80 | 89 | 89 |
| 4 | 96 | 94 | 87 | 97 | 93 | 86 |
| 5 | 81 | 73 | 79 | 71 | 77 | 66 |
| 6 | 84 | 70 | 77 | 63 | 64 | 64 |
| 7 | 54 | 75 | 74 | 65 | 59 | 68 |
| 8 | 78 | 62 | 79 | 89 | 73 | 76 |
| 9 | 75 | 71 | 88 | 93 | 74 | 78 |
| 10 | 71 | 70 | 67 | 81 | 75 | 90 |
| 11 | 70 | 69 | 73 | 70 | 77 | 75 |
| 12 | 60 | 78 | 86 | 87 | 87 | 65 |
| 13 | 86 | 94 | 81 | 99 | 93 | 94 |
| 14 | 74 | 74 | 80 | 92 | 78 | 90 |
| 15 | 70 | 75 | 79 | 83 | 88 | 71 |
| 16 | 75 | 82 | 82 | 98 | 93 | 88 |
| 17 | 82 | 87 | 91 | 99 | 93 | 96 |
| 18 | 77 | 84 | 82 | 90 | 96 | 91 |
| 19 | 55 | 73 | 60 | 62 | 69 | 62 |
| 20 | 82 | 71 | 82 | 95 | 94 | 85 |
| 21 | 62 | 77 | 71 | 84 | 94 | 79 |
| 22 | 82 | 82 | 73 | 92 | 73 | 77 |
| 23 | 85 | 87 | 84 | 92 | 94 | 93 |
| 24 | 89 | 88 | 87 | 62 | 64 | 81 |
| 25 | 76 | 70 | 87 | 75 | 100 | 75 |
| 26 | 91 | 81 | 97 | 86 | 81 | 85 |
| 27 | 86 | 91 | 96 | 75 | 90 | 91 |
| 28 | 90 | 77 | 94 | 91 | 86 | 99 |
| 29 | 90 | 88 | 94 | 79 | 82 | 77 |
| 30 | 81 | 76 | 96 | 66 | 87 | 75 |
| 31 | 74 | 54 | 85 | 51 | 79 | - |
| 32 | 90 | 82 | 94 | 78 | 90 | 73 |
| 33 | 97 | 70 | 84 | 86 | 93 | 78 |
| 34 | 75 | 79 | 83 | 92 | 87 | 84 |
| 35 | 80 | 72 | 87 | 85 | 94 | 81 |
| 36 | 78 | 85 | 82 | 86 | 82 | 54 |
| 37 | 79 | 68 | 72 | 50 | 63 | 81 |
| 38 | 82 | 72 | 72 | 88 | 76 | 87 |
| 39 | 82 | 82 | 91 | 98 | 86 | 92 |
| 40 | 77 | 69 | 82 | 89 | 66 | 84 |
| 41 | 87 | 78 | 83 | 88 | 75 | 83 |
| 42 | 69 | 77 | 74 | 71 | 67 | 74 |
| 43 | 67 | 77 | 70 | 62 | 57 | 68 |
| 44 | 73 | 79 | 71 | 77 | 70 | 65 |
| 45 | 92 | 79 | 76 | 99 | 66 | 86 |

TABLE 19

Z-SCORES FOR GRADE X EASTER EXAMINATIONS
MAJOR WORK GROUP

| Pupil | Lit. | Comp. | Geog. | Math. | Science | French | Average |
|---|---|---|---|---|---|---|---|
| 1 | 59.8 | 47.7 | 64.7 | 61.1 | 58.3 | 58.2 | 58.3 |
| 2 | 70.4 | 66.3 | 63.6 | 64.3 | 66.8 | 62.8 | 65.7 |
| 3 | 71.1 | 69.3 | 71.5 | 57.2 | 64.4 | 64.6 | 66.3 |
| 4 | 70.4 | 73.0 | 65.9 | 64.7 | 66.8 | 62.8 | 67.3 |
| 5 | 66.0 | 60.8 | 59.6 | 57.9 | 59.3 | 52.5 | 59.4 |
| 6 | 64.2 | 54.0 | 55.5 | 49.8 | 52.3 | 48.5 | 54.0 |
| 7 | 46.1 | 58.5 | 53.5 | 50.7 | 49.5 | 51.1 | 51.6 |
| 8 | 60.6 | 46.8 | 56.8 | 61.9 | 57.4 | 56.3 | 56.6 |
| 9 | 58.8 | 54.9 | 62.6 | 63.7 | 58.0 | 57.6 | 59.2 |
| 10 | 56.3 | 54.0 | 49.0 | 58.2 | 58.5 | 65.4 | 56.9 |
| 11 | 55.3 | 52.2 | 52.6 | 50.0 | 52.6 | 55.6 | 53.1 |
| 12 | 48.5 | 60.1 | 63.2 | 59.0 | 59.6 | 49.5 | 56.6 |
| 13 | 66.2 | 74.0 | 59.1 | 65.3 | 63.7 | 67.2 | 65.9 |
| 14 | 58.0 | 56.6 | 58.3 | 61.6 | 53.3 | 64.8 | 58.8 |
| 15 | 55.3 | 57.4 | 57.5 | 56.9 | 60.3 | 53.1 | 56.8 |
| 16 | 58.7 | 63.6 | 60.0 | 64.8 | 63.7 | 63.6 | 62.4 |
| 17 | 63.5 | 67.9 | 67.3 | 65.3 | 63.7 | 68.5 | 66.0 |
| 18 | 60.1 | 65.3 | 60.0 | 60.6 | 65.8 | 65.4 | 62.9 |
| 19 | 45.1 | 55.7 | 42.0 | 45.7 | 47.1 | 47.6 | 47.2 |
| 20 | 63.3 | 58.8 | 60.0 | 63.4 | 64.4 | 63.0 | 62.1 |
| 21 | 49.9 | 59.2 | 51.0 | 57.4 | 64.4 | 58.0 | 56.6 |
| 22 | 63.5 | 63.6 | 52.6 | 61.6 | 49.9 | 56.8 | 58.0 |
| 23 | 65.5 | 67.9 | 61.6 | 61.6 | 64.4 | 66.6 | 64.6 |
| 24 | 64.9 | 70.5 | 60.0 | 50.2 | 50.5 | 61.9 | 59.6 |
| 25 | 58.0 | 55.3 | 60.0 | 56.5 | 70.7 | 58.6 | 59.9 |
| 26 | 65.9 | 64.6 | 66.0 | 61.9 | 60.0 | 64.1 | 63.8 |
| 27 | 63.3 | 73.0 | 65.4 | 56.5 | 65.1 | 67.4 | 65.1 |
| 28 | 65.4 | 61.2 | 64.2 | 64.4 | 62.9 | 71.9 | 65.0 |
| 29 | 65.4 | 70.5 | 64.2 | 58.5 | 60.6 | 59.7 | 63.1 |
| 30 | 60.7 | 60.4 | 65.4 | 52.1 | 63.4 | 58.6 | 60.1 |
| 31 | 56.2 | 38.1 | 60.9 | 49.2 | 58.7 | - | 52.6 |
| 32 | 65.4 | 65.4 | 64.2 | 58.0 | 65.1 | 57.4 | 62.6 |
| 33 | 70.6 | 55.7 | 59.9 | 62.4 | 62.7 | 57.0 | 61.4 |
| 34 | 57.2 | 65.9 | 60.0 | 70.8 | 60.4 | 59.7 | 62.3 |
| 35 | 60.9 | 57.7 | 63.1 | 66.9 | 65.0 | 57.7 | 61.9 |
| 36 | 58.8 | 62.7 | 58.7 | 65.5 | 60.7 | 48.4 | 59.1 |
| 37 | 60.4 | 53.5 | 53.3 | 41.6 | 49.4 | 58.8 | 52.8 |
| 38 | 62.7 | 56.8 | 53.3 | 59.6 | 57.5 | 62.5 | 58.7 |
| 39 | 62.7 | 65.1 | 69.9 | 64.3 | 63.7 | 65.6 | 65.2 |
| 40 | 58.1 | 53.1 | 63.1 | 59.7 | 52.7 | 60.6 | 57.9 |
| 41 | 66.2 | 61.0 | 63.9 | 59.2 | 59.0 | 60.0 | 61.5 |
| 42 | 51.7 | 60.1 | 57.0 | 51.3 | 53.4 | 55.3 | 54.8 |
| 43 | 50.0 | 60.1 | 54.0 | 47.2 | 46.4 | 52.2 | 51.7 |
| 44 | 54.9 | 61.9 | 54.8 | 54.1 | 55.5 | 50.6 | 55.3 |
| 45 | 70.3 | 61.9 | 58.6 | 64.3 | 52.7 | 61.6 | 61.5 |

TABLE 20

RAW SCORES FOR GRADE X EASTER EXAMINATIONS
CONTROL GROUP

| Pupil | Lit. | Comp. | Geog. | Math. | Science | French |
|---|---|---|---|---|---|---|
| 1 | 95 | 79 | 85 | 86 | 98 | 73 |
| 2 | 91 | 71 | 84 | 95 | 92 | 80 |
| 3 | 80 | 81 | 75 | 51 | 54 | 57 |
| 4 | 74 | 73 | 72 | 53 | 83 | 57 |
| 5 | 67 | 74 | 69 | 34 | 46 | 69 |
| 6 | 87 | 79 | 83 | 80 | 56 | 84 |
| 7 | 70 | 81 | 92 | 86 | 90 | 85 |
| 8 | 86 | 86 | 91 | 94 | 91 | 75 |
| 9 | 75 | 62 | 74 | 67 | 67 | 50 |
| 10 | 65 | 70 | 67 | 33 | 71 | 70 |
| 11 | 79 | 67 | 79 | 92 | 90 | 66 |
| 12 | 71 | 90 | 83 | 98 | 83 | 84 |
| 13 | 81 | 75 | 84 | 86 | 91 | 74 |
| 14 | 86 | 81 | 83 | 94 | 93 | 87 |
| 15 | 69 | 82 | 63 | 79 | 89 | 88 |
| 16 | 55 | 70 | 71 | 86 | 79 | 69 |
| 17 | 50 | 74 | 75 | 66 | 91 | 40 |
| 18 | 46 | 64 | 75 | 79 | 91 | 58 |
| 19 | 72 | 80 | 77 | 92 | 88 | 90 |
| 20 | 65 | 79 | 86 | 83 | 71 | 84 |
| 21 | 75 | 71 | 86 | 90 | 89 | 87 |
| 22 | 59 | 51 | 80 | 80 | 89 | 63 |
| 23 | 75 | 82 | 79 | 69 | 59 | 88 |
| 24 | 56 | 89 | 68 | 50 | 61 | 44 |
| 25 | 75 | 78 | 93 | 85 | 84 | 70 |
| 26 | 81 | 83 | 96 | 95 | 92 | 75 |
| 27 | 95 | 78 | 92 | 71 | 82 | 75 |
| 28 | 82 | 87 | 94 | 86 | 87 | 86 |
| 29 | 73 | 90 | 92 | 91 | 86 | 81 |
| 30 | 65 | 76 | 96 | 92 | 81 | 74 |
| 31 | 78 | 76 | 99 | 95 | 94 | 85 |
| 32 | 82 | 84 | 89 | 86 | 86 | 82 |
| 33 | 71 | 72 | 85 | 88 | 89 | 74 |
| 34 | 83 | 85 | 90 | 97 | 84 | 83 |
| 35 | 72 | 80 | 84 | 99 | 83 | 81 |
| 36 | 87 | 95 | 84 | 80 | - | 82 |
| 37 | 69 | 73 | 89 | 83 | 85 | 85 |
| 38 | 88 | 80 | 74 | 91 | 60 | 82 |
| 39 | 91 | 84 | 91 | 93 | 92 | 93 |
| 40 | 68 | 59 | 59 | 46 | 74 | 46 |
| 41 | 74 | 72 | 76 | 92 | 71 | 66 |
| 42 | 77 | 67 | 63 | 54 | 55 | 44 |
| 43 | 69 | 72 | 71 | 77 | 73 | 67 |
| 44 | 76 | 67 | 63 | 66 | 80 | 50 |
| 45 | 78 | 78 | 69 | 84 | 58 | 80 |

TABLE 21

Z-SCORES FOR GRADE X EASTER EXAMINATIONS
CONTROL GROUP

| Pupil | Lit. | Comp. | Geog. | Math. | Science | French | Average |
|---|---|---|---|---|---|---|---|
| 1 | 69.6 | 61.8 | 63.3 | 59.8 | 69.7 | 55.2 | 63.2 |
| 2 | 66.7 | 55.8 | 63.6 | 63.8 | 66.2 | 59.3 | 62.6 |
| 3 | 58.6 | 63.3 | 56.4 | 44.3 | 44.0 | 45.7 | 52.1 |
| 4 | 54.2 | 57.3 | 54.0 | 45.2 | 60.9 | 45.7 | 52.9 |
| 5 | 53.9 | 57.6 | 50.3 | 36.3 | 42.1 | 51.8 | 48.7 |
| 6 | 66.0 | 62.0 | 59.3 | 57.7 | 47.8 | 61.5 | 59.1 |
| 7 | 55.7 | 63.8 | 65.1 | 60.5 | 67.0 | 62.2 | 62.4 |
| 8 | 65.4 | 68.3 | 64.5 | 64.2 | 67.6 | 55.7 | 64.3 |
| 9 | 58.8 | 46.8 | 53.5 | 51.7 | 54.0 | 39.4 | 50.7 |
| 10 | 52.7 | 54.0 | 49.0 | 35.9 | 56.3 | 52.4 | 50.0 |
| 11 | 61.1 | 55.7 | 57.6 | 62.2 | 62.1 | 53.1 | 58.6 |
| 12 | 56.0 | 70.6 | 60.8 | 64.8 | 56.8 | 61.1 | 61.7 |
| 13 | 62.8 | 57.4 | 61.6 | 58.5 | 62.4 | 55.0 | 59.6 |
| 14 | 66.2 | 62.9 | 60.8 | 62.7 | 63.7 | 62.9 | 63.2 |
| 15 | 54.6 | 63.6 | 44.4 | 54.7 | 61.0 | 63.6 | 57.0 |
| 16 | 43.5 | 58.0 | 51.0 | 59.6 | 55.9 | 54.6 | 53.8 |
| 17 | 41.7 | 56.6 | 54.2 | 47.9 | 62.4 | 34.2 | 49.5 |
| 18 | 39.0 | 47.8 | 54.2 | 54.7 | 62.4 | 45.2 | 50.6 |
| 19 | 56.7 | 61.8 | 55.9 | 61.6 | 60.3 | 64.8 | 60.2 |
| 20 | 51.9 | 60.9 | 63.2 | 56.9 | 48.5 | 61.1 | 57.1 |
| 21 | 58.7 | 53.9 | 63.2 | 60.6 | 61.0 | 62.9 | 60.1 |
| 22 | 46.4 | 43.2 | 58.4 | 57.1 | 61.5 | 51.5 | 53.0 |
| 23 | 58.1 | 67.4 | 57.6 | 52.4 | 44.6 | 64.5 | 57.4 |
| 24 | 47.5 | 71.3 | 48.4 | 44.3 | 48.8 | 41.4 | 50.3 |
| 25 | 57.5 | 62.1 | 63.6 | 61.4 | 61.7 | 55.8 | 60.3 |
| 26 | 60.7 | 66.3 | 65.4 | 66.4 | 66.2 | 58.6 | 63.9 |
| 27 | 68.0 | 62.1 | 63.0 | 54.6 | 60.6 | 58.6 | 61.1 |
| 28 | 61.2 | 69.6 | 64.2 | 61.9 | 63.4 | 64.7 | 64.2 |
| 29 | 56.4 | 72.1 | 63.0 | 64.4 | 62.9 | 61.9 | 63.4 |
| 30 | 52.2 | 60.4 | 65.4 | 64.9 | 60.0 | 58.0 | 60.2 |
| 31 | 59.1 | 60.4 | 67.2 | 66.4 | 67.4 | 64.1 | 64.1 |
| 32 | 61.2 | 67.1 | 61.2 | 61.9 | 62.9 | 62.4 | 62.8 |
| 33 | 53.9 | 57.4 | 60.5 | 63.5 | 60.4 | 54.9 | 58.4 |
| 34 | 63.5 | 67.6 | 69.0 | 63.9 | 62.5 | 60.0 | 64.4 |
| 35 | 55.1 | 63.5 | 63.8 | 64.8 | 61.8 | 58.8 | 61.3 |
| 36 | 64.8 | 70.6 | 60.2 | 62.7 | - | 67.1 | 65.1 |
| 37 | 52.8 | 57.7 | 68.1 | 57.2 | 63.1 | 61.3 | 60.0 |
| 38 | 67.3 | 63.5 | 55.0 | 61.0 | 47.5 | 59.4 | 59.0 |
| 39 | 69.6 | 66.8 | 69.9 | 62.0 | 67.4 | 66.2 | 67.0 |
| 40 | 50.9 | 44.4 | 45.6 | 39.8 | 58.3 | 40.7 | 46.6 |
| 41 | 55.7 | 55.8 | 58.6 | 61.0 | 56.2 | 51.2 | 56.4 |
| 42 | 58.1 | 51.4 | 48.7 | 43.5 | 45.0 | 39.7 | 47.7 |
| 43 | 51.7 | 55.8 | 54.8 | 54.1 | 57.6 | 51.7 | 54.3 |
| 44 | 57.3 | 51.4 | 48.7 | 49.0 | 62.4 | 42.8 | 51.9 |
| 45 | 58.9 | 61.0 | 53.2 | 57.3 | 47.1 | 58.5 | 56.0 |

TABLE 22

MEANS AND STANDARD DEVIATIONS OF DISTRIBUTIONS OF GRADE XI DEPARTMENT OF EDUCATION EXAMINATIONS SCORES, JUNE 1961

| Subject | N | Mean | Standard Deviation |
|---|---|---|---|
| Literature | 8258 | 52.82 | 15.45 |
| Composition | 8261 | 53.21 | 14.09 |
| Social Studies | 8064 | 53.67 | 16.43 |
| Mathematics | 7634 | 54.51 | 20.19 |
| Chemistry | 7670 | 63.91 | 18.18 |
| Physics | 4798 | 57.07 | 18.67 |
| French | 5572 | 52.62 | 18.32 |

TABLE 23

RAW SCORES FOR GRADE XI DEPARTMENT OF EDUCATION EXAMINATIONS
MAJOR WORK GROUP

| Pupil | Lit. | Comp. | Hist. | Math. | Chem. | Phys. | French |
|---|---|---|---|---|---|---|---|
| 1 | 73 | 79 | 74 | 77 | 86 | 74 | 74 |
| 2 | 68 | 82 | 69 | 84 | 83 | 87 | 80 |
| 3 | 82 | 86 | 84 | 69 | 84 | 79 | 82 |
| 4 | 76 | 61 | 85 | 88 | 88 | 87 | 79 |
| 5 | 60 | 69 | 70 | 65 | 68 | - | 66 |
| 6 | 74 | 60 | 67 | 36 | 59 | - | 56 |
| 7 | 61 | 72 | 60 | 29 | 58 | 53 | 40 |
| 8 | 66 | 69 | 57 | 62 | 87 | 74 | 61 |
| 9 | 58 | 68 | 81 | 77 | 77 | 93 | 55 |
| 10 | 62 | 68 | 81 | 73 | 85 | 76 | 83 |
| 11 | 65 | 66 | 50 | 44 | 81 | - | 67 |
| 12 | 82 | 72 | 71 | 62 | 81 | 73 | 41 |
| 13 | 91 | 75 | 89 | 96 | 97 | 95 | 90 |
| 14 | 74 | 71 | 85 | 85 | 88 | 86 | 88 |
| 15 | 67 | 63 | 79 | 71 | 79 | 89 | 80 |
| 16 | 71 | 65 | 76 | 93 | 90 | 90 | 89 |
| 17 | 88 | 73 | 90 | 95 | 89 | 91 | 93 |
| 18 | 86 | 75 | 81 | 65 | 77 | 83 | 92 |
| 19 | 65 | 70 | 52 | 73 | 88 | 55 | 58 |
| 20 | 67 | 59 | 81 | 81 | 68 | 79 | 81 |
| 21 | 66 | 73 | 88 | 90 | 92 | 96 | 75 |
| 22 | 75 | 65 | 85 | 89 | 74 | - | 83 |
| 23 | 81 | 72 | 90 | 85 | 85 | 89 | 86 |

TABLE 24

Z-SCORES FOR GRADE XI DEPARTMENT OF EDUCATION EXAMINATIONS
MAJOR WORK GROUP

| Pupil | Lit. | Comp. | Hist. | Math. | Chem. | Phys. | French | Average |
|---|---|---|---|---|---|---|---|---|
| 1 | 63.1 | 68.3 | 62.4 | 61.1 | 62.2 | 59.1 | 61.7 | 62.5 |
| 2 | 59.8 | 70.4 | 59.3 | 64.6 | 60.5 | 63.0 | 64.9 | 63.7 |
| 3 | 68.9 | 73.3 | 68.5 | 57.2 | 61.1 | 61.7 | 66.0 | 65.2 |
| 4 | 65.0 | 55.5 | 69.1 | 66.6 | 63.3 | 66.0 | 64.4 | 64.3 |
| 5 | 54.6 | 61.2 | 59.9 | 55.2 | 52.3 | - | 57.3 | 56.8 |
| 6 | 63.7 | 54.8 | 58.1 | 40.8 | 47.3 | - | 51.8 | 52.8 |
| 7 | 55.3 | 63.3 | 53.9 | 37.4 | 46.7 | 47.8 | 43.1 | 49.6 |
| 8 | 58.5 | 61.2 | 52.0 | 53.7 | 62.7 | 59.1 | 54.6 | 57.4 |
| 9 | 53.4 | 60.5 | 66.6 | 61.1 | 57.2 | 69.2 | 51.3 | 59.9 |
| 10 | 55.9 | 60.5 | 66.6 | 59.2 | 61.6 | 60.1 | 66.6 | 61.5 |
| 11 | 57.9 | 59.1 | 47.8 | 44.8 | 59.4 | - | 57.8 | 54.5 |
| 12 | 68.9 | 63.3 | 60.5 | 53.7 | 59.4 | 58.5 | 43.7 | 58.3 |
| 13 | 74.7 | 65.5 | 71.5 | 70.6 | 68.2 | 70.3 | 70.4 | 70.2 |
| 14 | 63.7 | 62.6 | 69.1 | 65.1 | 63.3 | 65.5 | 69.3 | 65.5 |
| 15 | 59.2 | 56.9 | 65.4 | 58.2 | 58.3 | 67.1 | 64.9 | 61.4 |
| 16 | 61.8 | 58.4 | 63.6 | 69.1 | 64.4 | 67.6 | 69.9 | 64.9 |
| 17 | 72.8 | 64.0 | 72.1 | 70.1 | 63.8 | 68.2 | 72.0 | 69.0 |
| 18 | 71.5 | 65.5 | 66.6 | 55.2 | 57.2 | 63.9 | 71.5 | 64.5 |
| 19 | 57.9 | 61.9 | 49.0 | 59.2 | 63.3 | 48.9 | 52.9 | 56.1 |
| 20 | 59.2 | 54.1 | 66.6 | 63.1 | 52.3 | 61.7 | 65.5 | 60.4 |
| 21 | 58.5 | 64.0 | 70.9 | 67.6 | 65.5 | 70.9 | 62.2 | 65.6 |
| 22 | 64.4 | 58.4 | 69.1 | 67.1 | 55.6 | - | 66.6 | 63.5 |
| 23 | 68.2 | 63.3 | 72.1 | 65.1 | 61.6 | 67.1 | 68.2 | 66.5 |

TABLE 25

RAW SCORES FOR GRADE XI DEPARTMENT OF EDUCATION EXAMINATIONS
CONTROL GROUP

| Pupil | Lit. | Comp. | Hist. | Math. | Chem. | Phys. | French |
|---|---|---|---|---|---|---|---|
| 1 | 71 | 70 | 74 | 78 | 82 | 88 | 74 |
| 2 | 70 | 70 | 68 | 85 | 75 | 90 | 72 |
| 3 | 61 | 64 | 71 | 52 | 72 | - | 36 |
| 4 | 60 | 55 | 66 | 38 | 80 | 66 | 51 |
| 5 | 63 | 63 | 60 | - | - | - | 50 |
| 6 | 69 | 61 | 61 | 56 | 84 | - | 74 |
| 7 | 76 | 71 | 83 | 88 | 92 | 90 | 83 |
| 8 | 83 | 72 | 85 | 90 | 93 | 92 | 86 |
| 9 | 29 | 51 | 69 | 56 | 79 | 50 | - |
| 10 | 52 | 50 | 72 | 37 | 55 | - | 40 |
| 11 | 64 | 59 | 60 | 44 | 73 | 79 | 51 |
| 12 | 71 | 80 | 76 | 87 | 87 | 81 | 83 |
| 13 | 80 | 74 | 79 | 81 | 85 | 84 | 84 |
| 14 | 70 | 70 | 88 | 86 | 90 | 86 | 78 |
| 15 | 68 | 68 | 69 | 81 | 95 | 89 | 89 |
| 16 | 45 | 73 | 71 | 74 | 75 | 76 | 59 |
| 17 | 65 | 70 | 61 | 67 | 82 | 79 | 62 |
| 18 | 74 | 63 | 61 | 64 | 72 | 70 | 75 |
| 19 | 70 | 72 | 74 | 81 | 83 | 84 | 85 |
| 20 | 70 | 70 | 66 | 66 | 69 | 78 | 83 |
| 21 | 72 | 76 | 92 | 71 | 86 | 84 | 84 |
| 22 | 56 | 69 | 72 | 57 | 86 | 78 | 53 |
| 23 | 60 | 78 | 74 | 64 | 65 | - | 82 |

TABLE 26

Z-SCORES FOR GRADE XI DEPARTMENT OF EDUCATION EXAMINATIONS
CONTROL GROUP

| Pupil | Lit. | Comp. | Hist. | Math. | Chem. | Phys. | French | Average |
|---|---|---|---|---|---|---|---|---|
| 1 | 61.8 | 61.9 | 62.4 | 61.6 | 60.0 | 66.6 | 61.7 | 62.3 |
| 2 | 61.1 | 61.9 | 58.7 | 65.1 | 56.1 | 67.6 | 60.6 | 61.6 |
| 3 | 55.3 | 57.7 | 60.5 | 48.8 | 54.5 | - | 40.9 | 52.9 |
| 4 | 54.6 | 51.3 | 57.5 | 41.8 | 58.9 | 54.8 | 49.1 | 52.6 |
| 5 | 56.6 | 56.9 | 53.9 | - | - | - | 48.6 | - |
| 6 | 60.5 | 55.5 | 54.5 | 50.7 | 61.1 | - | 61.7 | 57.3 |
| 7 | 65.0 | 62.6 | 67.9 | 66.6 | 65.5 | 67.6 | 66.9 | 66.0 |
| 8 | 69.5 | 63.3 | 69.1 | 67.6 | 66.0 | 68.7 | 68.2 | 67.5 |
| 9 | 34.6 | 48.4 | 59.3 | 50.7 | 58.3 | 46.2 | - | 49.6 |
| 10 | 49.5 | 47.7 | 61.2 | 41.3 | 45.1 | - | 43.1 | 48.0 |
| 11 | 57.2 | 54.1 | 53.9 | 44.8 | 55.0 | 61.7 | 49.1 | 53.7 |
| 12 | 61.8 | 69.0 | 63.6 | 66.1 | 62.7 | 62.8 | 66.6 | 64.6 |
| 13 | 67.6 | 64.8 | 65.4 | 63.1 | 61.6 | 64.4 | 67.1 | 64.9 |
| 14 | 61.1 | 61.9 | 70.9 | 65.6 | 64.4 | 65.5 | 63.9 | 64.7 |
| 15 | 59.8 | 60.5 | 59.3 | 63.1 | 67.1 | 67.1 | 69.9 | 63.8 |
| 16 | 44.9 | 64.0 | 60.5 | 59.7 | 56.1 | 60.1 | 53.5 | 57.0 |
| 17 | 57.9 | 61.9 | 54.5 | 56.2 | 60.0 | 61.7 | 55.1 | 58.2 |
| 18 | 63.7 | 56.9 | 54.5 | 54.7 | 54.5 | 56.9 | 62.2 | 57.6 |
| 19 | 61.1 | 63.3 | 62.4 | 63.1 | 60.5 | 64.4 | 67.7 | 63.2 |
| 20 | 61.1 | 61.9 | 57.5 | 55.7 | 52.8 | 61.2 | 66.6 | 59.5 |
| 21 | 62.4 | 66.2 | 73.3 | 58.2 | 62.2 | 64.4 | 67.1 | 64.8 |
| 22 | 52.1 | 61.2 | 61.2 | 51.2 | 62.2 | 61.2 | 50.2 | 57.0 |
| 23 | 54.6 | 67.6 | 62.4 | 54.7 | 56.6 | - | 66.0 | 59.3 |

APPENDIX G

WATSON-GLASER CRITICAL THINKING APPRAISAL SCORES

TABLE 27

WATSON-GLASER CRITICAL THINKING APPRAISAL SCORES

| Pupil | Grade XI | | Pupil | Grade X | |
|---|---|---|---|---|---|
| | Major Work | Control | | Major Work | Control |
| 1 | 81 | 72 | 24 | 65 | 78 |
| 2 | 75 | 71 | 25 | 75 | 84 |
| 3 | 80 | - | 26 | 63 | 58 |
| 4 | 78 | 71 | 27 | 74 | 81 |
| 5 | 61 | 70 | 28 | 67 | 70 |
| 6 | 58 | 59 | 29 | 74 | 75 |
| 7 | 65 | 63 | 30 | 71 | 72 |
| 8 | 68 | 83 | 31 | 61 | 65 |
| 9 | 82 | - | 32 | 54 | 68 |
| 10 | 70 | 58 | 33 | 68 | 65 |
| 11 | 75 | - | 34 | - | 66 |
| 12 | - | 81 | 35 | 67 | 70 |
| 13 | 81 | 83 | 36 | 72 | 68 |
| 14 | 84 | 73 | 37 | 67 | 74 |
| 15 | 73 | 77 | 38 | 69 | 65 |
| 16 | 83 | 72 | 39 | 78 | 65 |
| 17 | 86 | 67 | 40 | 69 | 80 |
| 18 | 80 | 69 | 41 | 70 | 79 |
| 19 | 68 | 67 | 42 | 72 | 73 |
| 20 | 61 | 74 | 43 | 71 | 78 |
| 21 | 75 | - | 44 | 60 | 59 |
| 22 | 58 | 68 | 45 | 67 | 63 |
| 23 | 73 | 68 | | | |