

AN ANALYSIS OF CLINICAL CASES AND NON-CLINICAL CASES
AS DETERMINED BY AN ARITHMETIC PROFICIENCY TEST

By
Myron S. Miller

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ABSTRACT

Numerous conjectures have been offered by various interested persons regarding students who show a lack of proficiency in arithmetic. In some cases, sweeping generalizations have been made about such students without the necessary evidence to support them. This study was conducted to obtain evidence concerning at least some of the pertinent questions involved. In particular, the study was an attempt to answer the following questions:

1. Do low levels of performance on an Arithmetic Proficiency Test occur in any particular patterns within the new-student population at Michigan State University?
2. Does the level of performance of students on the Arithmetic Proficiency Test serve as an indication of the probable attrition of students at Michigan State University?
3. Does the level of performance of students on the Arithmetic Proficiency Test serve as an indication of the probable achievement of students at Michigan State University?

In considering the first question, eight categories within the new-student population were analyzed. Scores on a reading test, a writing test, and a psychological test were also utilized. In considering the second and third questions, a follow-up study over a four-year period was completed on some six hundred freshmen composed of students with the highest scores, the middle scores, and the lowest scores on the arithmetic test given in the fall of 1951.

Findings of the Study

Patterns. The percentage of females with low scores on the arithmetic test was significantly higher than the percentage of males. The percentage of freshmen with low scores on the test was significantly higher than the percentage of transfer students.

There was no difference in the percentage of students with low scores on the test for students from Michigan high schools and for students from non-Michigan high schools. Likewise, there was no difference for students from large high schools and for students from small high schools.

For Class A, Class B, and Class D schools as a group, the percentage of students with low scores on the test was significantly lower for students from College-Agreement high schools than for students from non-College Agreement high schools. Class C schools showed a slight reversal of this tendency.

Two (of the eight) preference groups differed significantly from each of the other preference groups. Education students received low scores on the test most frequently; engineering students received low scores least frequently.

Most students with low scores on the arithmetic test received relatively low scores on the quantitative section of the psychological test.

Multiple-deficiency cases (involving reading, writing, and arithmetic) occurred most frequently for students with a deficiency in writing, and least frequently for students with a deficiency in arithmetic.

Attrition. Students with high scores on the arithmetic test showed a significantly higher rate of return than students with middle scores. Students with low scores on the test showed a significantly lower rate of return than students with middle scores. Students with multiple deficiencies showed an even lower rate of return.

Achievement. Students with high scores on the arithmetic test showed significantly higher achievement than students with middle scores. Students with multiple sufficiencies showed even higher achievement. Students with low scores on the test showed significantly lower achievement than students with middle scores. Students with multiple deficiencies showed even lower achievement.

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Myron S. Miller

Candidate for the Degree

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Dissertation: An Analysis of Clinical Cases
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as determined by an
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Outline of Studies:

Major subject: Education

Minor subject: Mathematics

Education: B.A., Michigan State College, 1944
M.A., Michigan State College, 1950
(Major subject, Mathematics;
Minor subject, Education)

Experience: Administrative Specialist,
Army Air Forces, 1943-1946

Instructor, Mathematics and
Improvement Services, Michigan
State University, 1946-1956

Organizations: Phi Kappa Phi, 1943

Pi Mu Epsilon, 1948

National Council of Teachers
of Mathematics

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CHAPTER I

INTRODUCTION

For the period encompassed by the present study, namely, 1951-1955, Michigan State University¹ included a Basic College and the following Upper Schools: Agriculture, Business and Public Service, Education, Engineering, Home Economics, Science and Arts, and Veterinary Medicine.

Normally, a student was enrolled in the Basic College for his first two years and then transferred to the Upper School of his choice for the final two years.

The program of basic education for all students was instituted at Michigan State University in 1944. In the fall of 1952, the program assumed its present form which required all students to complete four basic courses, namely: Communication Skills, Natural Science, Social Science, and Humanities.

1 Prior to July 1, 1955, Michigan State University was known as Michigan State College. The designation University has been employed throughout this study.

These courses accounted for approximately one-fourth of the credits required for graduation. Normally, a student was enrolled in Communication Skills and Natural Science during his freshman year and then enrolled in Social Science and Humanities during his sophomore year. The balance of his course work during the first two years consisted of courses offered by other departments of the university.(1)

Prior to 1950, a growing concern had been evidenced by administrative officials and faculty members regarding the lack of proficiency in arithmetic on the part of students enrolled in courses in business, chemistry, and the biological and physical sciences. As a result of this concern, an eight-member All-College Committee on Arithmetic was appointed to study the problem.

A two-hour per week, non-credit, one-term course was formulated by the committee and instituted on a trial basis in the spring of 1950 in an attempt to correct deficiencies in arithmetic. In addition to the fundamental operations of addition, subtraction, multiplication, and division, the course was designed to include a study of fractions, decimals, percentage, proportion, equations, formulas, and rounding off numbers.

A temporary screening test was devised for new students. The test sampled the areas referred to above, and students with low scores were urged to enroll in the course. The committee recommended that the class size of the sections in the non-credit arithmetic course should not exceed twenty students.(2)

Other non-credit courses in reading, writing, and speech had been established within the Department of Communication Skills as early as 1946. Such courses were designed not only to help the returning veteran bridge gaps in his training, but also to assist other college students as well.

The responsibility for the administration of the course in arithmetic was also entrusted to the Head of the Department of Communication Skills. In turn, he appointed a director for the program in arithmetic and employed instructors as needed for the 1950-1951 school year.

With the Head of the Department of Communication Skills as its chairman, the All-College Committee on Arithmetic met regularly to concern itself with the problem at hand as well as the implications of the problem. After a series of meetings, the committee assumed the position that all citizens should have a minimum competency in arithmetic.²

2 P. D. Bagwell, Professor and Head, Department of Communication Skills - Interview.

The findings of the committee and its views were discussed at regular meetings of the faculty of Michigan State University, and on June 7, 1951, the faculty unanimously approved the following regulation:

- A. That all new students, including transfers, [shall] be required to take an arithmetic proficiency test.
- B. That all students who fail the test [shall] be required to enroll in an Arithmetic Clinic and to continue therein until they can demonstrate attainment of minimum standards in arithmetic, as established by the All-College Committee on Arithmetic.(3)

The Problem

Statement of the problem. As an instructor of some of the students who enrolled in the non-credit course in arithmetic during the period of this study, the writer became interested in the overall program and the various problems associated with it.

Numerous conjectures had been offered by various interested persons regarding students who showed a lack of proficiency in arithmetic. In some cases, sweeping generalizations had been made about such students without the necessary evidence to support them. The purpose of this study was to obtain evidence concerning at least some of the pertinent questions involved. In particular, the study was an attempt to answer the following questions:

1. Do low levels of performance on the Arithmetic Proficiency Test occur in any particular patterns within the new-student population at Michigan State University?

2. Does the level of performance of students on the Arithmetic Proficiency Test serve as an indication of the probable attrition of students at Michigan State University?

3. Does the level of performance of students on the Arithmetic Proficiency Test serve as an indication of the probable achievement of students at Michigan State University?

In carrying out the study, it was necessary

(1) to make an analysis of the clinical cases and the parent population for eight classifications within the new-student population, namely: sex; status, that is, freshman or transfer; geographical origin; class of high school attended (Michigan high schools only); College-Agreement status of high school attended (Michigan high schools only); major preference in college; psychological test scores; and deficiencies in other skills (Reading and Writing);

(2) to determine the degree of attrition for the new-student population and for certain groups, contained therein, as determined by the level of performance of the students on the Arithmetic Proficiency Test; and

(3) to determine the achievement of the new-student population and of certain groups, contained therein, as determined by the level of performance of the students on the Arithmetic Proficiency Test.

Importance of the study. The faculty action which required new students to take an Arithmetic Proficiency Test meant that upwards of three thousand new students would be tested each fall, and that a portion of these students would be enrolled in the non-credit course in arithmetic.

The new-student population was studied with the thought that the low levels of performance on the test might occur in definite patterns within the new-student population. If such patterns were found, it might then be possible to focus attention on them and to take more direct corrective measures.

The development of the test involved considerable time and effort as did the actual administration and scoring of the test. Since a large mass of students was involved, the possible usefulness of test results for other than screening purposes was considered. Thus, attention was directed to the question of whether the level of performance on the Arithmetic Proficiency Test might also serve as an indication of the probable attrition and/or achievement of students in college.

In addition, it was hoped that the study might provide information which would be helpful in planning for the needs of those students who were required to complete the non-credit course in arithmetic. By studying the attrition and achievement of those students as compared with that of students at other levels of performance on the Arithmetic Proficiency Test, it was hoped that some evaluation of the program might be inferred, or that at least a basis might be formed for future comparisons.

Definitions of Terms Used

Clinical cases. New students who received less than 60 per cent on an Arithmetic Proficiency Test were designated as clinical cases. In turn, new students who received 60 per cent or higher on the test were designated as non-clinical cases.

This division was an arbitrary one and was influenced by administrative considerations. In the process of testing new students, it was determined that the available staff for the non-credit course could accommodate those students who scored below 60 per cent on the test. The division was not intended to imply that students who received scores of 60 per cent or higher might not also profit from such a course. It was felt, however, that the relative need for the course was greater for students who scored below 60 per cent.

Attrition. Attrition was interpreted to cover those students who entered college in the fall of a given year but who failed to return in subsequent fall terms to fulfill the normal college schedule.

Achievement. Achievement was interpreted in terms of whether the students earned the bachelor's degree within the normal four-year period; whether they were still in school but had not obtained their degrees; or whether they had dropped out of school.

For the students who received degrees, honor status was also considered. For the students who were still in school but had not obtained degrees, the likelihood of graduating was considered. For the students who dropped out of school, a determination was made as to whether the students had less than a "C" average as well as whether the students reached an Upper School before dropping out.

The grading system at Michigan State University provided for the following grades: A - excellent; B - superior; C - average; D - inferior; and F - failure. A "C" average was required for graduation, and a "B" average entitled a student to graduate with honors.(4)

Development of the Test and the Program

Following the faculty action in June 1951, a new test, for screening purposes, was prepared by the director of the program in arithmetic. The test was approved by the Board of Examiners (a board entrusted with responsibility for the overall program of testing new students at Michigan State University).

The test consisted of 45 multiple-choice items, and was first administered to some three thousand new students in the fall of 1951. The median score on the test was 34 (that is, 76 per cent); and the standard deviation was 5.8. The scores ranged from seven to forty-five, with only three of the three thousand students receiving perfect scores.

Ordinarily, the students were able to complete the test in from thirty to forty-five minutes. However, no time limit was imposed on the students who took the test.

From the three thousand answer sheets to the arithmetic test, the answer sheets of the students who received the 270 highest scores, the 270 middle scores, and the 270 lowest scores were selected for the purpose of item analysis.

The 270 highest scores on the 45-item test were scores above 40 (that is, above 90 per cent). The 270 lowest scores were scores below 27 (that is, below 60 per cent). The 270 middle scores were scores about the median score of 34 (that is, 76 per cent).

The analysis of these 810 answer sheets revealed the number of students who had missed each item. On the basis of this information, the items were arranged in the order of increasing difficulty.

The answer sheets were also analyzed for the three separate groups, namely: the High Group, the Middle Group, and the Low Group. The analysis revealed that:

only item 1 failed to discriminate between the Low Group and the High Group;

only items 1, 2, 44, and 45 failed to discriminate between the Low Group and the Middle Group; and

only items 1, 3, 4, 5, 6, and 7 failed to discriminate between the Middle Group and the High Group.

The test, known as the Arithmetic Proficiency Test, has been used as a screening device for new students during the period of the present study, namely, 1951-1955. On two subsequent occasions, the reliability of the instrument, using the test-retest method on samples of 150 students, was found to be in the range .92 - .95. A copy of the test has been included in the Appendix.

During the period of the study (1951-1955), students who received scores below 60 per cent on the Arithmetic Proficiency Test were required to enroll in the non-credit course in arithmetic. The course was taught by the same two instructors throughout this period.

Students who enrolled in the course were retested periodically during the term with one-hour tests which consisted of 50 problems. While these tests were not of the multiple-choice type, the problems were similar to those included on the 45-item, multiple-choice, Arithmetic Proficiency Test. Students who reached the 80 per cent level or higher on the tests, prior to the end of the term, were released from the course, if they so desired.

During each term, every effort was made to work with the students individually not only in the two one-hour meetings each week, but also in individual conferences. Stress was placed upon having each student work at his optimum rate.

Inasmuch as the non-credit course in arithmetic was established to correct deficiencies in that area, it was felt that the minimum acceptable grade should be a "C". Accordingly, each student received a letter grade of "A", "B", "C", or "F" for his work in the course, and the grade became a part of his permanent record at Michigan State University.

Each student was assured of sufficient individual help in the course to ensure his obtaining at least a grade of "C". Theoretically then, the "F" grade was superfluous. In practice, however, an occasional student did not attend class meetings and in such a case, the "F" grade was necessary.

Literature related to the Problem

Arithmetic, as such, has not held status as a course at the college level other than in the form of a special-methods course for prospective teachers. In fact, the subject has been considered somewhat incidental to other courses at the college level, and in some cases at the high-school level as well.

Thus, while college instructors may have assumed that the college student had a skill in the arithmetical processes, the student may not have had any formal contact with the subject of arithmetic since his enrollment in junior high school. Larsen (of Albion College) has called attention to this factor as an influence in the lack of proficiency in arithmetic by college students.(5)

Other indications of concern regarding the level of proficiency in arithmetic of high-school graduates have been evidenced elsewhere.

In 1950, Leonhardy (at the University of Missouri) completed a study of the mathematics used in books in the general education areas of humanities, social science, and natural science at certain colleges and universities.

Among the conclusions reached by Leonhardy were these:

Mathematics is used extensively in each of the areas of general education. Physical science has the highest mathematical content per page, with biological science, the humanities, and social science following in order.

The mathematics needed is relatively simple, the arithmetic of the elementary school and certain concepts and processes from each of the four years of high school mathematics.

The student who enters college without preparation in the essential mathematics will be handicapped in programs of general education such as that represented in the present study, unless provision for remedying the deficiency is made.

Among the recommendations offered by Leonhardy were these:

Competence in mathematics should be one of the objectives of a program of general education.

The mathematics courses for general education should have adequate time, should enlist the best teaching personnel, and should be vitalized by applications from the areas of general education.(6)

A committee report by members of the faculties of Andover, Exeter, Lawrenceville, Harvard, Princeton, and Yale included mathematical ability as one of seven skills which the committee considered should result from general education. Among the skills listed by the committee were

the ability to read intelligently, to write effectively, to speak clearly, and to listen sensitively. Facility with a foreign language, and the capacity for logical and objective thinking completed the listing.(7)

In the Fiftieth Yearbook of the National Society for the Study of Education, Van Engen (of Iowa State Teachers College) called attention to the lack of mathematical ability exhibited by our armed forces in World War II, and a similar lack of ability on the part of public-school graduates who entered business.(8)

In discussing the retail business with the National Council of Teachers of Mathematics, Stephenson (an executive of the J. L. Hudson Company) called attention to the fact that the business of retail distribution is a vast problem of relatively simple arithmetic. He pointed out that retailing needs thousands of people who are proficient in arithmetic.

Stephenson indicated that his company felt that, with its staff of some ten to fifteen thousand employes, it had a fairly representative sample of the Detroit population and its scholastic accomplishments. He went on to say that the employes were found to be "strangely" lacking in a knowledge of arithmetic and the ability to write legibly.

In concluding, Stephenson expressed the hope that educators would be instrumental in reindoctrinating students with a determination to become truly proficient in an art as essential as arithmetic.(9)

Organization

The thesis has been organized into five chapters:

Chapter I, Introduction, presents the problem, its importance, definitions of terms, and pertinent background information.

Chapter II, Analysis of Clinical Cases and Parent Population, analyzes the data with respect to eight categories.

Chapter III, Attrition of Clinical Cases and Non-Clinical Cases, considers the extent of withdrawals from school for clinical cases and non-clinical cases.

Chapter IV, Achievement of Clinical Cases and Non-Clinical Cases, compares the achievement of clinical cases with non-clinical cases.

Chapter V, Summary, Conclusions, and Implications, presents the findings of the study, conclusions based on the findings, and implications drawn from these findings and these conclusions.

General Plan of Study

The general plan of study was longitudinal. In analyzing the clinical cases and parent population in Chapter II, insofar as possible, information was obtained concerning the new-student group which entered Michigan State University in the fall of 1951. Then in studying the attrition of students in Chapter III and the achievement of students in Chapter IV, a follow-up was made of the same students over the normal four-year college period.

In Chapter II, certain supplementary information was included concerning the new-student groups which entered Michigan State University in the fall of 1952, 1953, and 1954. In this sense, the plan of study was cross-sectional in nature.

Footnotes

1 Michigan State College Catalog 1952-1953,
A Bulletin of Michigan State College, Vol. 47, No. 12,
September, 1952, pp. 57-58.

2 Minutes of the All-College Committee on
Arithmetic, Michigan State College, 1950-1951.

3 Minutes of the Michigan State College Faculty,
June, 1951.

4 Michigan State College Catalog 1951-1952,
A Bulletin of Michigan State College, Vol. 45, No. 18,
May, 1951, pp. 75-76, 83.

5 H. D. Larsen, Arithmetic for Colleges,
New York: The Macmillan Co., 1950, p. v, Preface.

6 A. V. Leonhardy, "The Mathematics Used in the
Humanities, Social Science, and Natural Science Areas in a
Program of General Education on the College Level"
(Ed. D. thesis, University of Missouri, 1950). Seen in
abstract only - The University of Missouri Bulletin,
Vol. 53, No. 5, February 10, 1952 (Education Series,
No. 46, Study 45) pp. 84-85.

7 General Education in School and College,
(A Committee Report by Members of the Faculties of Andover,
Exeter, Lawrenceville, Harvard, Princeton, and Yale),
Cambridge: Harvard University Press, 1952, p. 22.

8 H. Van Engen, "Arithmetic in the Junior-Senior
High School," The Teaching of Arithmetic, (Fiftieth Year-
book, Part II, National Society for the Study of Education)
Chicago: University of Chicago Press, 1951, pp. 103-119.

9 E. C. Stephenson, "Mathematics in a Retail
Business," The Mathematics Teacher, Vol. 46, No. 1,
January, 1953, pp. 18-22.

CHAPTER II

ANALYSIS OF CLINICAL CASES AND PARENT POPULATION

This chapter has been devoted to determining the existence or lack of existence of significant patterns in the new-student population.

Students were classified according to the following categories: sex; status, that is, freshman or transfer; geographical origin; class of high school attended (Michigan high schools only); College-Agreement status of high school attended (Michigan high schools only); major preference in college; psychological test scores; and deficiencies in other skills (reading and writing).

The analysis was based on the new-student groups which entered Michigan State University in the fall of 1951, 1952, 1953, and 1954.

A significant difference is interpreted to mean significant at the 1 per cent level (unless otherwise indicated); that is, the possibility of the occurrence being attributed to chance is less than one out of one hundred. The standard statistical procedure, as outlined by McNemar, has been employed.(1)

Sex

Information obtained from the Registrar's office concerning the enrollment of new undergraduate students over the four-year period, 1951-1954, has been presented in Table 1.(2) While a gradual increase in the male-female ratio has occurred, the change from year to year was not significant. The male-female ratio has been approximately three-to-two throughout the four-year period.

TABLE 1
NEW UNDERGRADUATE STUDENTS

| Year | Tot. No. | Males | | Females | |
|------|-------------|-------|------|---------|------|
| | | No. | % | No. | % |
| 1951 | 3127 | 1775 | 56.8 | 1352 | 43.2 |
| 1952 | 3843 | 2246 | 58.4 | 1597 | 41.6 |
| 1953 | 4062 | 2390 | 58.8 | 1672 | 41.2 |
| 1954 | 4271 | 2613 | 61.2 | 1658 | 38.8 |

The extent of low scores on the Arithmetic Proficiency Test administered to new students has been presented in Table 2. No significant change was noted from year to year. The number of students with low scores on the test approached one out of every eight.

TABLE 2
RESULTS OF ARITHMETIC PROFICIENCY TEST

| Year | No. Examined | No. Below 60% | % |
|------|-----------------|------------------|------|
| 1951 | 3022 | 357 | 11.5 |
| 1952 | 3788 | 400 | 10.6 |
| 1953 | 3957 | 490 | 12.4 |
| 1954 | 4036 | 502 | 12.4 |

In Table 3, a breakdown of the low scores according to sex has been presented. When compared with the data in Table 1, a near reversal in the male-female ratio was observed.

TABLE 3
CLINICAL POPULATION

| Year | No. | M | % | F | % |
|------|-----|-----|------|-----|------|
| 1951 | 357 | 150 | 42.0 | 207 | 58.0 |
| 1952 | 400 | 172 | 43.0 | 228 | 57.0 |
| 1953 | 490 | 228 | 46.5 | 262 | 53.5 |
| 1954 | 502 | 234 | 46.6 | 268 | 53.4 |

In order to facilitate a comparison of the extent of deficiencies in arithmetic according to sex, the male-female ratios for new students obtained in Table 1 were projected on the total numbers examined (see Table 2). This data has been presented in Table 4. Significant differences between males and females were observed for each of the years included in the study, as well as for the totals. That is, the percentage of males with low scores on the Arithmetic Proficiency Test was significantly lower than the percentage of females.

TABLE 4
RESULTS OF ARITHMETIC PROFICIENCY TEST
ACCORDING TO SEX

| Year | No. Exam. | Males Below 60% | % | No. Exam. | Females Below 60% | % |
|------|--------------|-----------------------|------------|--------------|-------------------------|-------------|
| 1951 | 1715 | 150 | 8.7 | 1307 | 207 | 15.8 |
| 1952 | 2214 | 172 | 7.8 | 1574 | 228 | 14.5 |
| 1953 | 2328 | 228 | 9.8 | 1629 | 262 | 16.1 |
| 1954 | <u>2469</u> | <u>234</u> | <u>9.5</u> | <u>1567</u> | <u>268</u> | <u>17.1</u> |
| Tot. | 8726 | 784 | 9.0 | 6077 | 965 | 15.9 |

Status - Freshman or Transfer

In Table 5, the number of new students in the fall of 1951 has been broken down into the number of freshmen students and the number of transfer students. Transfer students were new students who had entered Michigan State University in the fall of 1951 with sophomore status or above. Approximately one out of every four new students was a transfer student in the fall of 1951.

TABLE 5
TRANSFER STUDENTS AND FRESHMEN STUDENTS
FALL 1951

| Status | No. | % | M | % | F | % |
|--------|-------------|-------------|-------------|-------------|-------------|-------------|
| Tr. | 734 | 23.5 | 480 | 27.0 | 254 | 18.8 |
| Fr. | <u>2393</u> | <u>76.5</u> | <u>1295</u> | <u>73.0</u> | <u>1098</u> | <u>81.2</u> |
| Tot. | 3127 | 100.0 | 1775 | 100.0 | 1352 | 100.0 |

The extent of low scores on the Arithmetic Proficiency Test in the fall of 1951 for freshmen and for transfer students has been presented in Table 6. The percentage of freshmen with low scores on the test was significantly higher than the percentage of transfer students.

TABLE 6
RESULTS OF ARITHMETIC PROFICIENCY TEST
FALL 1951

| Status | No. Exam. | No. Below 60% | % |
|--------|--------------|------------------|-------------|
| Tr. | 709 | 55 | 7.8 |
| Fr. | <u>2313</u> | <u>302</u> | <u>13.1</u> |
| Tot. | 3022 | 357 | 11.5 |

A breakdown of the low scores on the Arithmetic Proficiency Test in the fall of 1951 according to sex has been presented in Table 7.

The percentage of male freshmen with low scores on the test was significantly higher than the percentage of male transfer students.

There was no significant difference between the percentage of female freshmen with low scores on the test and the percentage of female transfer students.

For freshmen students only, the percentage of males with low scores on the test was significantly lower than the percentage of females.

For transfer students only, the percentage of males with low scores on the test was significantly lower than the percentage of females.

TABLE 7
RESULTS OF ARITHMETIC PROFICIENCY TEST
ACCORDING TO SEX
FALL 1951

| Status | No. Exam. | Males Below 60% | % | No. Exam. | Females Below 60% | % |
|--------|--------------|-----------------------|-------------|--------------|-------------------------|-------------|
| Tr. | 464 | 25 | 5.4 | 245 | 30 | 12.2 |
| Fr. | <u>1251</u> | <u>125</u> | <u>10.0</u> | <u>1062</u> | <u>177</u> | <u>16.7</u> |
| Tot. | 1715 | 150 | 8.7 | 1307 | 207 | 15.8 |

Geographical Origin

A report of a study by Warrington dealing with the entire group of new students who entered Michigan State University in the fall of 1953 provided data on the enrollment of students who were from Michigan and also on the enrollment of students who were not from Michigan.(3) Totals for his data were computed and have been listed in Table 8, with his permission. Comparable data for the clinical cases have been presented in Table 9.

The percentage of clinical cases who were from Michigan was essentially the same as the percentage of Michigan students in the parent population. That is, there was no difference in the percentage of students with low scores on the Arithmetic Proficiency Test for students from Michigan high schools and for students from

non-Michigan high schools. Approximately four out of every five new students came from Michigan. This ratio also prevailed for the clinical cases. In both instances, it applied to males as well as to females.

TABLE 8
MICHIGAN AND NON-MICHIGAN
NEW STUDENTS
FALL 1953

| Sex | Tot. No. | Michigan No. | Michigan % | Non-Michigan No. | Non-Michigan % |
|---------|-------------|-----------------|---------------|---------------------|-------------------|
| Males | 2412 | 1890 | 78.4 | 522 | 21.6 |
| Females | <u>1686</u> | <u>1340</u> | <u>79.5</u> | <u>346</u> | <u>20.5</u> |
| Tot. | 4098 | 3230 | 78.8 | 868 | 21.2 |

TABLE 9
MICHIGAN AND NON-MICHIGAN
CLINICAL CASES
FALL 1953

| Sex | Tot. No. | Michigan No. | Michigan % | Non-Michigan No. | Non-Michigan % |
|---------|-------------|-----------------|---------------|---------------------|-------------------|
| Males | 228 | 183 | 80.3 | 45 | 19.7 |
| Females | <u>262</u> | <u>207</u> | <u>79.0</u> | <u>55</u> | <u>21.0</u> |
| Tot. | 490 | 390 | 79.6 | 100 | 20.4 |

Class of High School Attended

A study of 2,550 freshmen who entered Michigan State University after attending Michigan high schools was undertaken. These students entered the University in the fall of 1953.(4)

The Michigan High School Athletic Association has classified Michigan high schools according to size for the purpose of arranging athletic schedules and regulating competition. The 1953 classification was utilized in this study in order to coincide with the group under consideration.(5) The classification, based on student population, was as follows:

Class A - 800 or more

Class B - 325 - 799

Class C - 150 - 324

Class D - 75 - 149

Class E - less than 75
(Upper Peninsula only).

On that basis, Michigan had 723 high schools classified for athletic purposes. The distribution, according to classes, has been presented in Table 10.

TABLE 10

DISTRIBUTION OF MICHIGAN HIGH SCHOOLS ACCORDING
TO ATHLETIC ASSOCIATION CLASSIFICATION
1953

| Class | No. | % |
|-------|-----------|------------|
| A | 75 | 10.4 |
| B | 179 | 24.7 |
| C | 245 | 33.9 |
| D | 203 | 28.1 |
| E | <u>21</u> | <u>2.9</u> |
| Tot. | 723 | 100.0 |

Of the 723 high schools, 646 were located in the Lower Peninsula and the remaining 77 were located in the Upper Peninsula. A breakdown, according to class, for each peninsula has been prepared in Table 11.

TABLE 11
DISTRIBUTION OF MICHIGAN HIGH SCHOOLS ACCORDING
TO LOWER PENINSULA AND UPPER PENINSULA
1953

| Class | No. | L.P. | % | U.P. | % |
|-------|-----------|----------|----------|-----------|--------------|
| A | 75 | 75 | 100.0 | - | - |
| B | 179 | 162 | 90.5 | 17 | 9.5 |
| C | 245 | 227 | 92.7 | 18 | 7.3 |
| D | 203 | 182 | 89.7 | 21 | 10.3 |
| E | <u>21</u> | <u>-</u> | <u>-</u> | <u>21</u> | <u>100.0</u> |
| Tot. | 723 | 646 | 89.4 | 77 | 10.6 |

Approximately two out of every three high schools in Michigan sent freshmen to Michigan State University in the fall of 1953. A tabulation of the data by class, as well as by peninsula, has been presented in Table 12.

Only for Class D and Class E did less than 50 per cent of the schools send freshmen to Michigan State University.

In view of the relatively small numbers involved, the percentages were not appreciably altered by either the inclusion or lack of inclusion of Upper Peninsula schools.

A listing has been included in the Appendix of the schools which sent students and the schools which did not send students. In the former case, the numbers involved have been included.

TABLE 12
HIGH SCHOOLS SENDING FRESHMEN
TO MICHIGAN STATE UNIVERSITY
FALL 1953

| Class | No. | Send Fr. | % | No Fr. | % |
|-------|-----------|-------------|-------------|-----------|-------------|
| A | 75 | 68 | 90.7 | 7 | 9.3 |
| B | 179 | 151 | 84.4 | 28 | 15.6 |
| C | 245 | 170 | 69.4 | 75 | 30.6 |
| D | 203 | 78 | 38.4 | 125 | 61.6 |
| E | <u>21</u> | <u>3</u> | <u>14.3</u> | <u>18</u> | <u>85.7</u> |
| Tot. | 723 | 470 | 65.0 | 253 | 35.0 |
| L.P. | 646 | 433 | 67.0 | 213 | 33.0 |
| U.P. | 77 | 37 | 48.1 | 40 | 51.9 |

Table 13 has been utilized to present a breakdown by class of the 2,550 freshmen from Michigan and a similar breakdown for the 390 clinical cases from Michigan.

The percentage distribution for clinical cases from Michigan was essentially the same as for the parent population. That is, there was no difference in the percentage of students with low scores on the Arithmetic Proficiency Test for students from large schools and for students from small schools. Expressed otherwise, the probability of receiving a low score on the Arithmetic Proficiency Test appeared to be independent of the size of the high school which the student attended.

TABLE 13
FRESHMEN VERSUS CLINICAL CASES
FALL 1953

| Class | Freshmen | | Clinical Cases | |
|-------|-----------|------------|----------------|------------|
| | No. | % of Tot. | No. | % of Tot. |
| A | 1104 | 43.3 | 170 | 43.6 |
| B | 739 | 29.0 | 112 | 28.7 |
| C | 531 | 20.8 | 79 | 20.3 |
| D&E | 142 | 5.6 | 19 | 4.9 |
| Uncl. | <u>34</u> | <u>1.3</u> | <u>10</u> | <u>2.5</u> |
| Tot. | 2550 | 100.0 | 390 | 100.0 |
| L.P. | 2457 | 96.4 | 378 | 96.9 |
| U.P. | 93 | 3.6 | 12 | 3.1 |

College-Agreement Status of High School Attended

The Michigan College Agreement was an agreement entered into between member colleges and member high schools. The agreement required member colleges to admit students from member high schools, if properly recommended, regardless of the type of high-school curriculum followed. The colleges, of course, reserved the right to require students entering specialized curricula to make up prerequisite courses on a non-credit basis.(6) While not a specific requirement, in general, schools which maintained an acceptable guidance program were able to qualify for membership.

In practice, the program permitted the medium-sized schools greater flexibility in gearing their curriculum to the needs of the majority of the students who were not likely to attend college. At the same time, the agreement provided for the admission to college of students who were considered to be college material. The earlier practice had been to require all students to follow a college-entrance curriculum.

Most Michigan colleges and universities became members of the agreement. In the overall picture, approximately one high school out of every three was found to be a member of the Michigan College Agreement as of 1953.(7) However, for the two larger classes, A and B, approximately one-half of the high schools held membership. The distribution, according to class, of such high schools has been presented in Table 14.

TABLE 14
COLLEGE-AGREEMENT HIGH SCHOOLS
1953

| Class | No. | C.A. | % | Non-CA | % |
|-------|-----------|----------|------------|-----------|-------------|
| A | 75 | 38 | 50.7 | 37 | 49.3 |
| B | 179 | 86 | 48.0 | 93 | 52.0 |
| C | 245 | 78 | 31.8 | 167 | 68.2 |
| D | 203 | 25 | 12.3 | 178 | 87.7 |
| E | <u>21</u> | <u>2</u> | <u>9.5</u> | <u>19</u> | <u>90.5</u> |
| Tot. | 723 | 229 | 31.7 | 494 | 68.3 |
| L.P. | 646 | 207 | 32.0 | 439 | 68.0 |
| U.P. | 77 | 22 | 28.6 | 55 | 71.4 |

The data on the number of College-Agreement high schools which sent freshmen to Michigan State University in the fall of 1953 has been presented in Table 15. The data was prepared according to classes as well as for the Upper Peninsula and the Lower Peninsula. Comparable information, presented in Table 16, for the non-College Agreement high schools revealed that only 55 per cent of the non-College Agreement high schools sent freshmen as compared to the 86 per cent shown for the College-Agreement high schools.

TABLE 15
COLLEGE-AGREEMENT HIGH SCHOOLS SENDING
FRESHMEN TO MICHIGAN STATE UNIVERSITY
FALL 1953

| Class | No. | Send Fr. | % | No Fr. | % |
|-------|----------|-------------|-------------|-----------|-------------|
| A | 38 | 37 | 97.4 | 1 | 2.6 |
| B | 86 | 80 | 93.0 | 6 | 7.0 |
| C | 78 | 65 | 83.3 | 13 | 16.7 |
| D | 25 | 14 | 56.0 | 11 | 44.0 |
| E | <u>2</u> | <u>1</u> | <u>50.0</u> | <u>1</u> | <u>50.0</u> |
| Tot. | 229 | 197 | 86.0 | 32 | 14.0 |
| L.P. | 207 | 182 | 87.9 | 25 | 12.1 |
| U.P. | 22 | 15 | 68.2 | 7 | 31.8 |

TABLE 16
NON-COLLEGE AGREEMENT HIGH SCHOOLS SENDING
FRESHMEN TO MICHIGAN STATE UNIVERSITY
FALL 1953

| Class | No. | Send Fr. | % | No Fr. | % |
|-------|-----------|-------------|-------------|-----------|-------------|
| A | 37 | 31 | 83.8 | 6 | 16.2 |
| B | 93 | 71 | 76.3 | 22 | 23.7 |
| C | 167 | 105 | 62.9 | 62 | 37.1 |
| D | 178 | 64 | 36.0 | 114 | 64.0 |
| E | <u>19</u> | <u>2</u> | <u>10.5</u> | <u>17</u> | <u>89.5</u> |
| Tot. | 494 | 273 | 55.3 | 221 | 44.7 |
| L.P. | 439 | 251 | 57.2 | 188 | 42.8 |
| U.P. | 55 | 22 | 40.0 | 33 | 60.0 |

The distribution of the 2,550 freshmen by class and according to College-Agreement status has been included in Table 17. The comparable distribution of the 390 clinical cases has been given in Table 18. For the clinical group, the percentages of students who came from College-Agreement high schools were lower (except in Class C) than the percentages for the freshmen as a whole. This suggested that the College-Agreement students performed better on the Arithmetic Proficiency Test, or that the non-College Agreement students did not perform as well.

When the non-clinical cases were isolated from the freshman group for comparison with the clinical cases, the percentage differences were of course accentuated somewhat as shown in Table 19. When subjected to statistical analysis, the differences were not found to be significant at the 1 per cent level. However, Critical Ratios exceeding one were found for Class A (1.49), Class D (1.67), and for the Total (1.47). The ratios obtained for Class A and the Total corresponded to the 14 per cent level, while the ratio for Class D corresponded to the 9 per cent level. Of course, the influence of the Class C schools tended to offset the trend shown by the other classes. Removal of the Class C data yielded a Critical Ratio of 2.03 on the Total which was significant at the 5 per cent level.

TABLE 17
DISTRIBUTION OF FRESHMEN STUDENTS FROM
COLLEGE-AGREEMENT HIGH SCHOOLS
FALL 1953

| Class | No. | C.A. | % | Non-CA | % |
|-------|-----------|----------|----------|-----------|--------------|
| A | 1104 | 724 | 65.6 | 380 | 34.4 |
| B | 739 | 478 | 64.7 | 261 | 35.3 |
| C | 531 | 230 | 43.3 | 301 | 56.7 |
| D&E | 142 | 37 | 26.1 | 105 | 73.9 |
| Uncl. | <u>34</u> | <u>-</u> | <u>-</u> | <u>34</u> | <u>100.0</u> |
| Tot. | 2550 | 1469 | 57.6 | 1081 | 42.4 |
| L.P. | 2457 | 1423 | 57.9 | 1034 | 42.1 |
| U.P. | 93 | 46 | 49.5 | 47 | 50.5 |

TABLE 18
DISTRIBUTION OF CLINICAL CASES FROM
COLLEGE-AGREEMENT HIGH SCHOOLS
FALL 1953

| Class | No. | C.A. | % | Non-CA | % |
|-------|-----------|----------|----------|-----------|--------------|
| A | 170 | 103 | 60.6 | 67 | 39.4 |
| B | 112 | 68 | 60.7 | 44 | 39.3 |
| C | 79 | 36 | 45.6 | 43 | 54.4 |
| D&E | 19 | 4 | 21.1 | 15 | 78.9 |
| Uncl. | <u>10</u> | <u>-</u> | <u>-</u> | <u>10</u> | <u>100.0</u> |
| Tot. | 390 | 211 | 54.2 | 179 | 45.8 |
| L.P. | 378 | 201 | 53.2 | 177 | 46.8 |
| U.P. | 12 | 10 | 83.3 | 2 | 16.7 |

TABLE 19
CLINICAL CASES VERSUS NON-CLINICAL CASES
COLLEGE-AGREEMENT HIGH SCHOOLS
FALL 1953

| Class | No. | Clinical | | Non-Clinical | | |
|-----------|-----|----------|------|--------------|------|------|
| | | C.A. | % | No. | C.A. | % |
| A | 170 | 103 | 60.6 | 934 | 621 | 66.5 |
| B | 112 | 68 | 60.7 | 627 | 410 | 65.4 |
| C | 79 | 36 | 45.6 | 452 | 194 | 42.7 |
| D&E | 19 | 4 | 21.1 | 123 | 33 | 26.8 |
| Uncl. | 10 | - | - | 24 | - | - |
| Tot. | 390 | 211 | 54.2 | 2160 | 1258 | 58.2 |
| T minus C | 311 | 175 | 56.2 | 1708 | 1064 | 62.3 |

Major Preference in College

In reporting on the results of orientation tests given to 3,392 freshmen in the fall of 1954, Dahnke gave a breakdown according to schools for which preferences had been indicated.(8) The data have been listed in Table 20 with his permission. In addition, the corresponding percentages have been included.

The Warrington report contained a detailed breakdown of the curriculum preferences indicated by the 1953 freshmen.(9) For comparative purposes, his data have been tabulated according to school preferences (with his permission) and included in Table 20 also.

The order of preferences for the two years was the same. Approximately four out of every five freshmen designated a tentative major preference in the fall of 1954 as compared to three out of every four in the fall of 1953.

The Dahnke report included the percentages of students with low scores on the Arithmetic Proficiency Test for each of the preference groups.(10) With this information, the actual number of failures was determined for each preference group and has been included in Table 21.

The data was subjected to statistical analysis to determine whether significant differences existed between the various preference groups. The eight groups provided twenty-eight possible pairings. Of that number, thirteen showed significant differences at the 1 per cent level.

The percentage of Engineering students with low scores on the arithmetic test was significantly lower than the percentage shown for each of the seven other groups. The percentage of Education students with low scores on the test was significantly higher than the percentage shown for each of the other groups. Again, seven groups were involved, but the Education-Engineering group had already been counted with Engineering, leaving a net of thirteen significantly different pairings.

The Home Economics group and the No Preference group showed a significant difference at the 5 per cent level, as did the Veterinary Medicine group and the No Preference group. That is, at the 5 per cent level, the percentage of Home Economics students and the percentage of Veterinary Medicine students were significantly lower than the percentage of No Preference students with low scores on the arithmetic test.

When preference students as a group were compared with the No Preference students, a significant difference was found, favoring the preference students. That is, the percentage of preference students with low scores on the arithmetic test was significantly lower than the percentage of No Preference students.

However, since admission requirements in mathematics were higher for Engineering than for any other preference, the No Preference group was also compared with the preference group with the Engineering students deleted therefrom. Under this condition, there was no significant difference between the preference group and the No Preference group with respect to receiving low scores on the arithmetic test.

TABLE 20
DISTRIBUTION OF FRESHMEN ACCORDING TO
MAJOR PREFERENCE

| Group | Fall 1953 | | Fall 1954 | |
|--------------------------------|------------|------------|------------|------------|
| | No. | % | No. | % |
| No Preference | 789 | 24.3 | 667 | 19.7 |
| Business and Public Service | 691 | 21.3 | 751 | 22.1 |
| Science and Arts | 501 | 15.4 | 553 | 16.3 |
| Engineering | 444 | 13.8 | 539 | 15.9 |
| Education | 245 | 7.5 | 288 | 8.5 |
| Agriculture | 225 | 6.9 | 258 | 7.6 |
| Home Economics | 211 | 6.5 | 185 | 5.5 |
| Veterinary Medicine | <u>141</u> | <u>4.3</u> | <u>151</u> | <u>4.4</u> |
| Tot. | 3247 | 100.0 | 3392 | 100.0 |
| Tot. Pref. | 2458 | 75.7 | 2725 | 80.3 |

TABLE 21
DISTRIBUTION OF FRESHMEN WITH LOW SCORES
ON THE ARITHMETIC PROFICIENCY TEST
FALL 1954

| Group | No. Fr. | Low Scores | % |
|--------------------------------|------------|---------------|-------------|
| No Preference | 667 | 113 | 16.9 |
| Engineering | 539 | 11 | 2.0 |
| Veterinary Medicine | 151 | 15 | 9.9 |
| Home Economics | 185 | 19 | 10.3 |
| Agriculture | 258 | 33 | 12.8 |
| Science and Arts | 553 | 83 | 15.0 |
| Business and Public Service | 751 | 114 | 15.2 |
| Education | <u>288</u> | <u>73</u> | <u>25.3</u> |
| Tot. | 3392 | 461 | 13.6 |
| Tot. Pref. | 2725 | 348 | 12.8 |
| Pref. minus Eng. | 2186 | 337 | 15.4 |

Psychological Test Scores

The Board of Examiners at Michigan State University administered the American Council on Education Psychological Examination (1949 edition) to all new undergraduate students in the fall of 1951. The results provided a Q-score (quantitative score), and L-score (linguistic score), and a T-score (total score). Results were listed according to Derived Scores from one (lowest) to ten (highest). (11) Percentage distributions for Derived Scores are as follows:

| DS | % |
|----|----|
| 10 | 1 |
| 9 | 3 |
| 8 | 8 |
| 7 | 16 |
| 6 | 22 |
| 5 | 22 |
| 4 | 16 |
| 3 | 8 |
| 2 | 3 |
| 1 | 1 |

Inasmuch as the quantitative section of the psychological test contained parts on Arithmetic, Figure Analogies, and Number Series, an investigation was conducted to determine whether students who scored low, middle, or high on the Arithmetic Proficiency Test also scored low, middle, or high respectively on the quantitative section.

The students with the 270 highest scores on the Arithmetic Proficiency Test in the fall of 1951, the 270 middle scores, and the 270 lowest scores were selected.

Of the 810 students, 59 per cent were males and 41 per cent were females. This male-female ratio agreed with that of three-to-two for new students in general. While the male-female ratio for the Middle Group agreed with the male-female ratio for the sample and for the parent group, the Low Group in arithmetic was predominantly female, and the High Group in arithmetic was predominantly male. The distribution of the 810 students by sex has been presented in Table 22.

TABLE 22

DISTRIBUTION OF 810 ARITHMETIC SCORES
BY GROUPS AND ACCORDING TO SEX
FALL 1951

| Group | No. | M | % | F | % |
|-------|------------|------------|-------------|-----------|-------------|
| L-Gp | 270 | 118 | 24.7 | 152 | 45.7 |
| M-Gp | 270 | 168 | 35.2 | 102 | 30.6 |
| H-Gp | <u>270</u> | <u>191</u> | <u>40.1</u> | <u>79</u> | <u>23.7</u> |
| Tot. | 810 | 477 | 100.0 | 333 | 100.0 |

The Q-scores for the students in each of the three groups have been tabulated in Table 23.

For the High Group in arithmetic, 36 per cent were included in the upper three Derived Scores (the upper 12 per cent) on the quantitative section of the psychological test, and 88 per cent were included in the upper half of the Derived Scores.

For the Middle Group in arithmetic, 51 per cent were included in the two middle Derived Scores, namely Derived Scores 5 and 6, and 83 per cent were included in the middle four Derived Scores (4, 5, 6, 7).

For the Low Group in arithmetic, 42 per cent were included in the lower three Derived Scores (the lower 12 per cent) and 87 per cent were included in the lower half of the Derived Scores.

TABLE 23
 DISTRIBUTION OF Q-SCORES FOR 810 STUDENTS
 WHO TOOK ARITHMETIC PROFICIENCY TEST
 FALL 1951

| DS | No. | L-Group | | | No. | M-Group | | | No. | H-Group | | |
|-------|-----|---------|------|-----|-----|---------|------|-----|-----|---------|------|----|
| | | % | M | F | | % | M | F | | % | M | F |
| 10 | - | - | - | - | 1 | 0.4 | - | 1 | 12 | 4.4 | 10- | 2 |
| 9 | - | - | - | - | 5 | 1.8 | 3- | 2 | 23 | 8.5 | 17- | 6 |
| 8 | - | - | - | - | 13 | 4.8 | 10- | 3 | 62 | 23.0 | 49- | 13 |
| 7 | 6 | 2.2 | 2- | 4 | 52 | 19.2 | 38- | 14 | 86 | 31.9 | 59- | 27 |
| 6 | 29 | 10.7 | 13- | 16 | 68 | 25.3 | 43- | 25 | 54 | 20.0 | 38- | 16 |
| 5 | 61 | 22.6 | 27- | 34 | 71 | 26.3 | 41- | 30 | 25 | 9.3 | 13- | 12 |
| 4 | 60 | 22.2 | 28- | 32 | 33 | 12.2 | 13- | 20 | 5 | 1.8 | 3- | 2 |
| 3 | 59 | 21.9 | 22- | 37 | 15 | 5.6 | 12- | 3 | 3 | 1.1 | 2- | 1 |
| 2 | 39 | 14.4 | 19- | 20 | 7 | 2.6 | 4- | 3 | - | - | - | - |
| 1 | 15 | 5.6 | 6- | 9 | 2 | 0.7 | 2 | - | - | - | - | - |
| U* | 1 | 0.4 | 1 | - | 3 | 1.1 | 2 | 1 | - | - | - | - |
| Tot. | 270 | 100.0 | 118- | 152 | 270 | 100.0 | 168- | 102 | 270 | 100.0 | 191- | 79 |
| M-F % | | | 44- | 56 | | | 62- | 38 | | | 71- | 29 |

* Q-score unknown.

In addition, the Low Group was analyzed on the basis of arithmetic-only or single-deficiency cases versus multiple-deficiency cases involving arithmetic. This breakdown has been presented in Table 24.

For the single-deficiency group, 35 per cent were included in the lower three Derived Scores, and 85 per cent were included in the lower half of the scores.

For the multiple-deficiency group, 55 per cent were included in the lower three Derived Scores, and 90 per cent were included in the lower half of the scores.

TABLE 24
DISTRIBUTION OF Q-SCORES
FOR 270 LOW-GROUP CASES
FALL 1951

| DS | Single Deficiency | | | | Multiple Deficiency | | | |
|-------|-------------------|-------|--------|---|---------------------|-------|-------|---|
| | No. | % | M | F | No. | % | M | F |
| 7 | 3 | 1.8 | - | 3 | 3 | 3.0 | 2- | 1 |
| 6 | 23 | 13.5 | 7-16 | | 6 | 6.1 | 6 | - |
| 5 | 46 | 26.9 | 18-28 | | 15 | 15.2 | 9- | 6 |
| 4 | 40 | 23.4 | 17-23 | | 20 | 20.2 | 11- | 9 |
| 3 | 37 | 21.6 | 12-25 | | 22 | 22.2 | 10-12 | |
| 2 | 17 | 9.9 | 7-10 | | 22 | 22.2 | 12-10 | |
| 1 | 5 | 2.9 | - | 5 | 10 | 10.1 | 6- | 4 |
| U* | - | - | - | - | 1 | 1.0 | 1 | - |
| Tot. | 171 | 100.0 | 61-110 | | 99 | 100.0 | 57-42 | |
| M-F % | | | 36-64 | | | | 58-42 | |

* Q-Score unknown.

The totals for the three groups were tabulated in Table 25.

The percentage of cases for the totals for the upper five Derived Scores (51 per cent) was in substantial agreement with the percentage of cases for the lower five Derived Scores (49 per cent) and in conformity with the 50-50 ratio for all new students.

However, marked deviations occurred for the sexes. Since the percentages for the males were higher than the percentages for the females for each of the upper five Derived Scores and the reverse was true for the lower five Derived Scores, it suggested that the males had performed better than the females on the quantitative section of the psychological test. Deviations from the totals have been indicated in Table 26. For the males, three out of every five scored in the upper half on the quantitative section as compared to three out of every eight females. This represented a significant difference favoring the males.

TABLE 25

PERCENTAGE DISTRIBUTION OF Q-SCORES FOR 810 STUDENTS
WHO TOOK ARITHMETIC PROFICIENCY TEST
FALL 1951

| DS | No. | % of Tot. | M | % of Tot. | F | % of Tot. |
|-------|----------|--------------|----------|--------------|----------|--------------|
| 10 | 13 | 1.6 | 10 | 2.1 | 3 | 0.9 |
| 9 | 28 | 3.4 | 20 | 4.2 | 8 | 2.4 |
| 8 | 75 | 9.3 | 59 | 12.4 | 16 | 4.8 |
| 7 | 144 | 17.8 | 99 | 20.8 | 45 | 13.5 |
| 6 | 151 | 18.6 | 94 | 19.7 | 57 | 17.1 |
| 5 | 157 | 19.4 | 81 | 17.0 | 76 | 22.9 |
| 4 | 98 | 12.1 | 44 | 9.2 | 54 | 16.2 |
| 3 | 77 | 9.5 | 36 | 7.5 | 41 | 12.3 |
| 2 | 46 | 5.7 | 23 | 4.8 | 23 | 6.9 |
| 1 | 17 | 2.1 | 8 | 1.7 | 9 | 2.7 |
| U* | <u>4</u> | <u>0.5</u> | <u>3</u> | <u>0.6</u> | <u>1</u> | <u>0.3</u> |
| Tot. | 810 | 100.0 | 477 | 100.0 | 333 | 100.0 |
| M-F % | | | 59 | | 41 | |

* Q-score unknown.

TABLE 26
COMBINED PERCENTAGE DISTRIBUTION
OF Q-SCORES FOR 810 STUDENTS
FALL 1951

| DS | No. | % of Tot. | M | % of Tot. | F | % of Tot. |
|------------|----------|--------------|----------|--------------|----------|--------------|
| Upper half | 411 | 50.7 | 282 | 59.2 | 129 | 38.7 |
| Lower half | 395 | 48.8 | 192 | 40.2 | 203 | 61.0 |
| Unknown | <u>4</u> | <u>0.5</u> | <u>3</u> | <u>0.6</u> | <u>1</u> | <u>0.3</u> |
| Tot. | 810 | 100.0 | 477 | 100.0 | 333 | 100.0 |

Mean Derived Scores on the quantitative section of the psychological test for the three groups have been listed in Table 27. These scores confirmed the relative position of the Low Group, the Middle Group, and the High Group, as had been determined by the arithmetic test. The differences between the means for the respective groups were significant.

Significant differences between the means for males and females were not evident within each group. However, when taken in total, the mean Derived Score for the males on the quantitative section was significantly higher than the mean Derived Score for the females.

The total mean Derived Score for the sample of 810 cases was in agreement with the mean Derived Score for new students in general.

TABLE 27
MEAN DERIVED Q-SCORES
FOR 810 STUDENTS
FALL 1951

| Group | Mean | M | F |
|--------|------------|------------|------------|
| L-Gp | 3.8 | 3.8 | 3.8 |
| M-Gp | 5.5 | 5.6 | 5.4 |
| H-Gp | <u>7.0</u> | <u>7.2</u> | <u>6.8</u> |
| Tot. | 5.5 | 5.8 | 5.0 |
| S-Def. | 4.3 | 4.3 | 4.3 |
| M-Def. | 3.4 | 3.5 | 3.2 |

Deficiencies in Other Skills

Multiple deficiencies were interpreted as deficiencies in more than one area. Reading and writing were considered, in addition to arithmetic. The four possible groupings which resulted were reading and writing; reading and arithmetic; writing and arithmetic; and reading, writing, and arithmetic. The new undergraduate student population for the fall of 1951 was considered.

The reading deficiency cases were those students whose T-scores (total scores) on the American Council on Education Cooperative English Test, Test C2: Reading Comprehension (Form Y) were among the lower 12 per cent.(12)

The writing deficiency cases were those students who received less than seventeen correct items on a locally-developed 50-item multiple-choice English Usage Test. The arithmetic deficiency cases were those students who received low scores on the Arithmetic Proficiency Test.

Out of 3,022 new students examined in the fall of 1951, 736 students were deficient in at least one area. In other words, approximately one out of every four new students was found to be deficient in reading, writing, or arithmetic.

The probability of being deficient in only one area was .17 (530 cases); the probability of being deficient in two areas was .06 (169 cases); and the probability of being deficient in all three areas was .01 (37 cases).

Of the 1,715 males, 141 students, or 8.2 per cent, were multiple-deficiency cases. Of the 1,307 females, 65 students, or 5.0 per cent, were multiple-deficiency cases. The difference was significant. Of the males, 17.3 per cent were single-deficiency cases as compared to 17.9 per cent of the females. The overall picture has been presented in Table 28.

TABLE 28
NEW STUDENTS WITH DEFICIENCIES
IN ONE OR MORE AREAS
FALL 1951

| Sex | No. | Def. | % |
|--------|-------------|------|-------------|
| Male | 1715 | 437 | 25.5 |
| Female | <u>1307</u> | 299 | <u>22.9</u> |
| Tot. | 3022 | 736 | 24.4 |

Within the 736 deficiency cases, 72 per cent were deficient in only one area; 23 per cent were deficient in two areas; and 5 per cent were deficient in all three areas. One out of every three males had a multiple deficiency while one out of every five females had a multiple deficiency. The detailed data have been tabulated in Table 29. Key letter have been used to identify the subgroups.

TABLE 29
DISTRIBUTION OF 736 DEFICIENCY CASES
ACCORDING TO SUBGROUPS
FALL 1951

| Gps | No. | % | M | % | F | % |
|------|-----------|------------|-----------|------------|-----------|------------|
| A | 235 | 31.9 | 80 | 18.3 | 155 | 51.8 |
| R | 200 | 27.2 | 128 | 29.3 | 72 | 24.1 |
| W | 95 | 12.9 | 88 | 20.1 | 7 | 2.3 |
| AR | 55 | 7.5 | 25 | 5.7 | 30 | 10.0 |
| AW | 30 | 4.1 | 20 | 4.6 | 10 | 3.4 |
| RW | 84 | 11.4 | 71 | 16.3 | 13 | 4.4 |
| ARW | <u>37</u> | <u>5.0</u> | <u>25</u> | <u>5.7</u> | <u>12</u> | <u>4.0</u> |
| Tot. | 736 | 100.0 | 437 | 100.0 | 299 | 100.0 |

Similar data have been used in Table 30, but emphasis has been placed on the male-female ratios. While considerable fluctuation was observed among the groups, the ratio for the totals approximates that for new students in general of three-to-two. The greatest deviations occurred in the writing-only group and the reading-writing group where a strong male dominance was observed. On the other extreme, a female dominance occurred in the arithmetic-only group, and the arithmetic-reading group.

TABLE 30
DISTRIBUTION OF 736 DEFICIENCY CASES
ACCORDING TO SEX
FALL 1951

| Gps | No. | M | % | F | % |
|------|-----------|-----------|-------------|-----------|-------------|
| A | 235 | 80 | 34.0 | 155 | 66.0 |
| R | 200 | 128 | 64.0 | 72 | 36.0 |
| W | 95 | 88 | 92.6 | 7 | 7.4 |
| AR | 55 | 25 | 45.5 | 30 | 54.5 |
| AW | 30 | 20 | 66.7 | 10 | 33.3 |
| RW | 84 | 71 | 84.5 | 13 | 15.5 |
| ARW | <u>37</u> | <u>25</u> | <u>67.6</u> | <u>12</u> | <u>32.4</u> |
| Tot. | 736 | 437 | 59.4 | 299 | 40.6 |

In Tables 31, 32, and 33, the cases have been separated into the three areas: reading, writing, and arithmetic. The predominance of males in the writing area, and the predominance of females in the arithmetic area were again emphasized.

Approximately one-half of the reading cases had multiple deficiencies; three out of every five writing cases had multiple deficiencies; and one out of every three arithmetic cases had multiple deficiencies. Variations according to sex have been indicated.

TABLE 31
READING CASES
FALL 1951

| Gps | No. | M | F |
|-------------|-------------|-------------|-------------|
| R | 200 | 128 | 72 |
| AR | 55 | 25 | 30 |
| RW | 84 | 71 | 13 |
| ARW | <u>37</u> | <u>25</u> | <u>12</u> |
| Tot. | 376 | 249 (66.2%) | 127 (33.8%) |
| M-Def. % | 176 46.8 | 121 48.6 | 55 43.3 |

TABLE 32
WRITING CASES
FALL 1951

| Gps | No. | M | F |
|-------------|-------------|-------------|------------|
| W | 95 | 88 | 7 |
| AW | 30 | 20 | 10 |
| RW | 84 | 71 | 13 |
| ARW | <u>37</u> | <u>25</u> | <u>12</u> |
| Tot. | 246 | 204 (82.9%) | 42 (17.1%) |
| M-Def. % | 151 61.4 | 116 56.9 | 35 83.3 |

TABLE 33
ARITHMETIC CASES
FALL 1951

| Gps | No. | M | F |
|-------------|-------------|-------------|-------------|
| A | 235 | 80 | 155 |
| AR | 55 | 25 | 30 |
| AW | 30 | 20 | 10 |
| ARW | <u>37</u> | <u>25</u> | <u>12</u> |
| Tot. | 357 | 150 (42.0%) | 207 (58.0%) |
| M-Def. % | 122 34.2 | 70 46.7 | 52 25.1 |

Summary

I. Sex.

1. For the four-year period, 1951-1954, the percentage of males with low scores on the Arithmetic Proficiency Test (9.0) was significantly lower than the percentage of females (15.9). A significant difference occurred each year as well as for the totals. This caused the male-female ratio for clinical cases to deviate sharply from the three-to-two ratio for new students in general.

2. When the scores obtained by the males were combined with the scores obtained by the females, approximately one out of every eight new students received a low score on the Arithmetic Proficiency Test; that is, one out of every eight students scored below 60 per cent on the test.

II. Status - Freshman or Transfer.

1. Approximately one out of every four new students was a transfer student (sophomore or above) in the fall of 1951.

2. The percentage of freshmen with low scores on the Arithmetic Proficiency Test (13.1) was significantly higher than the percentage of transfer students (7.8).

3. The percentage of male freshmen with low scores on the test (10.0) was significantly higher than the percentage of male transfer students (5.4).

4. The percentage of female freshmen with low scores on the test (16.7) was not significantly different from the percentage of female transfer students (12.2).

5. For freshmen students only, the percentage of males with low scores on the test (10.0) was significantly lower than the percentage of females (16.7).

6. For transfer students only, the percentage of males with low scores on the test (5.4) was significantly lower than the percentage of females (12.2).

III. Geographical Origin.

1. Approximately four out of every five new students in the fall of 1953 came from Michigan. Likewise, four out of every five clinical cases came from Michigan. The ratio applied to both males and females.

2. There was no difference in the percentage of students with low scores on the Arithmetic Proficiency Test for students from Michigan high schools and for students from non-Michigan high schools.

IV. Class of High School Attended.

1. Out of 723 classified high schools (A, B, C, D) in Michigan, approximately two out of every three sent freshmen to Michigan State University in the fall of 1953.

2. There was no difference in the percentage of students with low scores on the Arithmetic Proficiency Test for students from large schools and for students from small schools, that is, according to classes - A, B, C, D.

V. College-Agreement Status of High School Attended.

1. Approximately one out of every three high schools in Michigan was a member of the Michigan College Agreement in 1953. However, for the larger schools, Class A and Class B, one-half of the high schools were members.

2. The College-Agreement high schools supplied 58 per cent of the Michigan freshmen who entered Michigan State University in the fall of 1953.

3. Of the College-Agreement high schools, 86 per cent sent freshmen to Michigan State University in the fall of 1953 as compared to 55 per cent of the non-College Agreement high schools.

4. Although the difference within each class was not significant statistically, College-Agreement students from Class A, Class B, and Class D schools performed better on the Arithmetic Proficiency Test than non-College Agreement students. On the other hand, College-Agreement students from Class C schools performed less well than the non-College Agreement students. The overall effect was one of counterbalancing which helped to prevent the occurrence of a statistically significant difference in the totals. However, when the Class C schools were removed from the totals, a significant difference at the 5 per cent level was found, favoring the College-Agreement students.

VI. Major Preference in College.

1. Approximately four out of every five freshmen designated a preference in the fall of 1954. The preferences in descending order were: Business and Public Service, Science and Arts, Engineering, Education, Agriculture, Home Economics, and Veterinary Medicine. The same order of preference was observed in the fall of 1953.

2. Out of the eight preference groups (including a No Preference group) and twenty-eight possible pairings, thirteen showed significant differences at the 1 per cent level on the Arithmetic Proficiency Test in the fall of 1954.

The percentage of Engineering students with low scores on the test (2.0) was significantly lower than the percentage for each of the other seven groups. The percentage of Education students with low scores on the test (25.3) was significantly higher than the percentage for each of the other groups.

The Home Economics group and the No Preference group showed a significant difference at the 5 per cent level, as did the Veterinary Medicine group and the No Preference group. That is, at the 5 per cent level, the percentage of Home Economics students and the percentage of Veterinary Medicine students were significantly lower than the percentage of No Preference students with low scores on the test.

3. When preference students as a group were compared with No Preference students with respect to low scores on the Arithmetic Proficiency Test, a significant difference was found, favoring the preference students. However, when the Engineering students were removed from the preference group, it showed no significant difference from the No Preference Group.

VII. Psychological Test Scores.

1. Of the 270 students with the highest scores on the Arithmetic Proficiency Test in the fall of 1951, 36 per cent were in the upper 12 per cent of the distribution of the new-student population on the quantitative section of the American Council on Education Psychological Examination.

Of the 270 students with middle scores on the arithmetic test, 51 per cent received middle scores on the quantitative section of the psychological test.

Of the 270 students with the lowest scores on the arithmetic test, 42 per cent were in the lower 12 per cent of the distribution on the quantitative section of the psychological test.

Of the High Group on the arithmetic test, 88 per cent scored in the upper half of the distribution on the quantitative section. Of the Low Group on the arithmetic test, 87 per cent scored in the lower half of the distribution on the quantitative section.

2. Of the 99 multiple-deficiency cases, isolated from the Low Group on the arithmetic test, 55 per cent were in the lower 12 per cent of the distribution on the quantitative section of the psychological test, and 90 per cent scored in the lower half of the distribution on the quantitative section.

3. For the combined sample of 810 cases, the male-female ratio was in agreement with the three-to-two ratio for the new-student parent group.

For the 477 males, 25 per cent were in the Low Group on arithmetic; 35 per cent were in the Middle Group; and 40 per cent were in the High Group.

For the 333 females, 46 per cent were in the Low Group on arithmetic; 30 per cent were in the Middle Group; and 24 per cent were in the High Group.

While the male-female ratio for the Middle Group agreed with the sample and with the parent group, the Low Group on arithmetic was predominantly female, and the High Group on arithmetic was predominantly male.

4. Of the three groups, the High Group on the Arithmetic Proficiency Test had the highest mean Derived Score on the quantitative section of the psychological test. The Middle Group on arithmetic had the middle score on the quantitative section; and the Low Group on

arithmetic had the lowest mean derived score on the quantitative section. The differences between the respective means were significant.

The total mean Derived Score for the sample was in agreement with the score for the parent group of new students.

5. Significant differences between males and females on the quantitative section of the psychological test were not evident within the three groups. But when taken in total, the mean derived score for the males on the quantitative section was significantly higher than for the females.

Three out of every five males scored in the upper half of the distribution of the new-student population on the quantitative section as compared to three out of every eight females. This represented a significant difference, favoring the males.

VIII. Deficiencies in Other Skills.

1. In the fall of 1951, approximately one out of every four of some three thousand new students was found to be deficient in at least one of the three skills: reading, writing, and arithmetic. Multiple-deficiency cases occurred at the rate of seven out of every one hundred new students. The percentage of males with multiple deficiencies (8.2) was significantly higher than the percentage of females (5.0).

2. Within the deficiency group of 736 cases, one out of every three males had multiple deficiencies as compared to one out of every five females. When males and females were considered together, 28 per cent had multiple deficiencies.

3. The male-female ratio for the 736 deficiency cases was in agreement with the three-to-two male-female ratio for the parent group of new students. However, a predominance of males in the writing category (five to one) and a predominance of females in the arithmetic category (three to two) were observed. In the reading category, the male-female ratio was two to one.

4. One out of every two reading cases had a multiple deficiency; three out of every five writing cases had a multiple deficiency; and one out of every three arithmetic cases had a multiple deficiency.

Footnotes

1 Quinn McNemar, Psychological Statistics, New York: John Wiley & Sons Inc., 1949, pp. 75-77.

2 "Distribution of Student Enrollments - New Students," Michigan State College (Office of the Registrar), Fall Term: 1951; 1952; 1953; 1954.

3 W. G. Warrington, "Some Data from the First Year of the Follow-Through Study of the Students entering Michigan State College in Fall, 1953," Michigan State College (Board of Examiners), Fall 1954, p. 7.

4 "New Students Fall Term 1953 - Alphabetical List by Michigan High Schools and Colleges," Michigan State College (Office of the Registrar), Fall 1953.

5 "Michigan High School Directory," Michigan High School Athletic Association Bulletin, Vol. 30, No. 4-5, November, 1953, (Lansing: Department of Public Instruction).

6 "Michigan Secondary School-College Agreement," Michigan College Association, November 7, 1946.

7 "Schools approved for Admission under the Michigan Secondary School-College Agreement," Lansing: Department of Public Instruction, 1953.

8 H. L. Dahnke, "Comparative Standings of the Various School and Curriculum Groups on the Orientation Week Examinations for the Fall of 1954," Michigan State College (Board of Examiners), Fall 1954, p. 11.

9 W. G. Warrington, op. cit., p. 15.

10 H. L. Dahnke, op. cit., p. 26.

11 "Test Scores by Students entering Fall Term 1951," Michigan State College (Board of Examiners), Fall 1951.

12 Ibid.

CHAPTER III

ATTRITION OF CLINICAL CASES AND NON-CLINICAL CASES

In this chapter, the extent to which certain students returned for their sophomore, junior, and senior years has been considered. These students had entered Michigan State University in the fall of 1951. A two-fold investigation was conducted.

First, 810 cases were considered. These cases consisted of students with the 270 highest scores on the Arithmetic Proficiency Test in the fall of 1951, the 270 middle scores, and the 270 lowest scores. Of the 810 cases, 612 students, or 76 per cent, were freshmen. The remaining 198 students were transfer students who had entered Michigan State University in the fall of 1951 with sophomore status or above.

In order to permit a follow-up over the normal four-year college period, attention has been focused on the 612 freshmen. The High Group contained 177 freshmen; the Middle Group contained 203 freshmen; and the Low Group contained 232 freshmen. The status of these students was determined as of the fall of 1952, 1953, and 1954.(1)

Within the Low Group, a breakdown according to single and multiple deficiencies was made. In addition, the cases which received treatment in the form of an arithmetic course were studied and grouped according to instructors involved.

Second, inasmuch as the study was especially concerned with the lower levels of performance on the Arithmetic Proficiency Test, an additional 82 borderline cases were also considered. These cases consisted of students with scores immediately above those of the Low Group on the arithmetic test. Their scores were, of course, lower than the scores obtained by the students in the Middle Group. These borderline cases had not received treatment in the form of an arithmetic course.

Of the 82 cases, 66 students, or 80 per cent, were freshmen. The remaining sixteen students were transfer students. The status of the 66 freshmen was determined as of the fall of 1952, 1953, and 1954.(2)

Unless otherwise indicated, a significant difference is interpreted to mean significant at the 1 per cent level.

Study of 612 Cases

Total Group. In an attempt to obtain evidence on the withdrawal from school of students in general, the 177 freshmen with high scores on the Arithmetic Proficiency Test were combined with the 203 freshmen with middle scores and the 232 freshmen with low scores. This sample of 612 cases had a male-female ratio of five to four and was in substantial agreement with that shown for the parent group of some twenty-four hundred freshmen in the fall of 1951.

As indicated in Table 34, approximately three-fourths of the students in the sample returned in the fall of the sophomore year; approximately five-ninths of the students in the sample returned for the junior year; and nearly one-half of the students in the sample returned for the senior year.

The difference between the return of males and females for the sophomore year was not significant. However, for the junior year and also for the senior year, the percentage of males who returned was significantly higher (5 per cent level) than the corresponding percentage of females.

TABLE 34
T-GROUP
SCHOOL STATUS OF 612 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|-----|-------|-----|-------|
| 1951 | 612 | 100.0 | 340 | 100.0 | 272 | 100.0 |
| 1952 | 450 | 73.5 | 254 | 74.7 | 196 | 72.1 |
| 1953 | 350 | 57.2 | 208 | 61.2 | 142 | 52.2 |
| 1954 | 289 | 47.2 | 176 | 51.8 | 113 | 41.5 |

In following up some 3,249 freshmen who entered school in the fall of 1953, Warrington found that 72.9 per cent returned in the fall of the sophomore year. For the males, 73.4 per cent returned as compared to 72.3 per cent of the females.(3) The difference between the return of males and females for the sophomore year was not significant.

The respective percentages found by Warrington for the 1953 group were essentially the same as those shown for the 1951 sample in Table 34. In other words, in both studies nearly three-fourths of the students returned for the sophomore year. The differences observed in the return of males and females at the sophomore level were negligible for both studies.

High Group. The data for the 177 cases with high scores on the Arithmetic Proficiency Test have been presented in Table 35. The percentages of students who returned to school subsequent years were substantially higher than those shown for the Total Group in Table 34. That is, a greater percentage of students who had high scores in arithmetic returned than was true for the sample of 612 cases. In fact, approximately seven out of every ten students with high scores in arithmetic returned for the senior year.

While the percentage of males who returned for the junior year and also for the senior year was noticeably higher than the percentage of females, the differences were not significant statistically.

TABLE 35
H-GROUP
SCHOOL STATUS OF 177 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|-----|-------|----|-------|
| 1951 | 177 | 100.0 | 118 | 100.0 | 59 | 100.0 |
| 1952 | 159 | 89.8 | 106 | 89.8 | 53 | 89.8 |
| 1953 | 141 | 79.7 | 98 | 83.1 | 43 | 72.9 |
| 1954 | 123 | 69.5 | 87 | 73.7 | 36 | 61.0 |

Middle Group. The data for the 203 cases with middle scores on the Arithmetic Proficiency Test have been presented in Table 36. The percentages shown for the Middle Group agreed essentially with those for the Total Group in Table 34.

The percentages of students for the Middle Group who returned to school were significantly lower than the corresponding percentages observed for the High Group.

Differences between males and females returning to school were less noticeable than for the group with high scores in arithmetic.

TABLE 36
M-GROUP
SCHOOL STATUS OF 203 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|-----|-------|----|-------|
| 1951 | 203 | 100.0 | 123 | 100.0 | 80 | 100.0 |
| 1952 | 153 | 75.4 | 91 | 74.0 | 62 | 77.5 |
| 1953 | 122 | 60.1 | 73 | 59.3 | 49 | 61.2 |
| 1954 | 99 | 48.8 | 61 | 49.6 | 38 | 47.5 |

Low Group. The group with low scores on the Arithmetic Proficiency Test was also the low group with respect to its students returning to school subsequent years. The percentages for the Low Group were significantly lower than the corresponding percentages for the Middle Group. In fact, only approximately three out of every ten students with low scores in arithmetic returned for the senior year. The data on the 232 cases have been presented in Table 37.

Again, the differences between males and females returning to school were rather slight and were not significant.

TABLE 37
L-GROUP
SCHOOL STATUS OF 232 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|----|-------|-----|-------|
| 1951 | 232 | 100.0 | 99 | 100.0 | 133 | 100.0 |
| 1952 | 138 | 59.5 | 57 | 57.6 | 81 | 60.9 |
| 1953 | 87 | 37.5 | 37 | 37.4 | 50 | 37.6 |
| 1954 | 67 | 28.9 | 28 | 28.3 | 39 | 29.3 |

Single-Deficiency Cases (136) versus Multiple-Deficiency Cases (96). The Low Group on the Arithmetic Proficiency Test was then broken up into arithmetic-only or single-deficiency cases and multiple-deficiency cases - arithmetic and writing; arithmetic and reading; or arithmetic, reading, and writing. The data have been included in Tables 38 and 39.

Again, the differences between males and females returning to school were not significant.

The percentages of the multiple-deficiency cases who returned to school for the junior year, and also for the senior year were significantly lower than the corresponding percentages for the single-deficiency cases. In fact, only 16 per cent of the multiple-deficiency cases returned for the senior year as compared to 38 per cent of the single-deficiency cases.

TABLE 38
SINGLE-DEFICIENCY GROUP
SCHOOL STATUS OF 136 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|----|-------|----|-------|
| 1951 | 136 | 100.0 | 44 | 100.0 | 92 | 100.0 |
| 1952 | 87 | 64.0 | 27 | 61.4 | 60 | 65.2 |
| 1953 | 62 | 45.6 | 22 | 50.0 | 40 | 43.5 |
| 1954 | 52 | 38.2 | 20 | 45.5 | 32 | 34.8 |

TABLE 39
MULTIPLE-DEFICIENCY GROUP
SCHOOL STATUS OF 96 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|----|-------|----|-------|
| 1951 | 96 | 100.0 | 55 | 100.0 | 41 | 100.0 |
| 1952 | 51 | 53.1 | 30 | 54.5 | 21 | 51.2 |
| 1953 | 25 | 26.0 | 15 | 27.3 | 10 | 24.4 |
| 1954 | 15 | 15.6 | 8 | 14.5 | 7 | 17.1 |

A breakdown according to the type of multiple deficiency involved has been presented in Table 40.

By the beginning of the senior year, eight of the original 41 freshmen with a deficiency in arithmetic and reading were still in school. Of the twenty-three arithmetic and writing cases, two students were still in school. Finally, of the thirty-two arithmetic, reading, and writing cases, five students were still in school.

TABLE 40
MULTIPLE-DEFICIENCY GROUP
BY TYPE OF DEFICIENCY
STATUS OF 96 CASES
1951-1954

| Year | No. | AR M | F | No. | AW M | F | No. | ARW M | F |
|------|-----|---------|----|-----|---------|---|-----|----------|----|
| 1951 | 41 | 18 | 23 | 23 | 16 | 7 | 32 | 21 | 11 |
| 1952 | 24 | 12 | 12 | 9 | 7 | 2 | 18 | 11 | 7 |
| 1953 | 14 | 8 | 6 | 5 | 4 | 1 | 6 | 3 | 3 |
| 1954 | 8 | 4 | 4 | 2 | 2 | - | 5 | 2 | 3 |

Cases which received Treatment - 188 Students.

Of the group of 232 freshmen with low scores on the Arithmetic Proficiency Test, forty-four students (19 per cent) withdrew from school before completing the required course in arithmetic. Twenty-three of the freshmen were males and twenty-one were females. Of the forty-four students, nineteen were single-deficiency cases and twenty-five were multiple-deficiency cases. Theoretically, if these new students had remained in school for three terms, they would have completed the course in arithmetic.

The remaining 188 students actually did complete the course and returned for their sophomore, junior, and senior years as indicated in Table 41. Thus, the actual clinical cases who received treatment showed more favorable percentages with respect to returning to school than the Low Group as a whole. In turn, the percentages for the cases who received treatment more nearly approached the percentages shown for the Middle Group (Table 36). In fact, there was no significant difference for the sophomore year. However, the treated group was significantly lower than the Middle Group for the junior year and also for the senior year.

TABLE 41
TREATED GROUP
SCHOOL STATUS OF 188 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|----|-------|-----|-------|
| 1951 | 188 | 100.0 | 76 | 100.0 | 112 | 100.0 |
| 1952 | 133 | 70.7 | 53 | 69.7 | 80 | 71.4 |
| 1953 | 84 | 44.7 | 35 | 46.1 | 49 | 43.8 |
| 1954 | 67 | 35.6 | 28 | 36.8 | 39 | 34.8 |

Single-Deficiency Treated Cases (117) versus
Multiple-Deficiency Treated Cases (71). The treated cases were broken up into a single-deficiency group and a multiple-deficiency group. These students returned for their sophomore, junior, and senior years as indicated in Tables 42 and 43.

The differences between males and females returning to school were not significant.

The percentages of the multiple-deficiency treated cases who returned to school for the junior year and also for the senior year were significantly lower than the corresponding percentages for the single-deficiency treated cases. In fact, only 21 per cent of the multiple-deficiency treated cases returned for the senior year as compared to 44 per cent of the single-deficiency treated cases.

TABLE 42
SINGLE-DEFICIENCY TREATED CASES
SCHOOL STATUS OF 117 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|----|-------|----|-------|
| 1951 | 117 | 100.0 | 36 | 100.0 | 81 | 100.0 |
| 1952 | 85 | 72.6 | 26 | 72.2 | 59 | 72.8 |
| 1953 | 61 | 52.1 | 22 | 61.1 | 39 | 48.1 |
| 1954 | 52 | 44.4 | 20 | 55.6 | 32 | 39.5 |

TABLE 43
MULTIPLE-DEFICIENCY TREATED CASES
SCHOOL STATUS OF 71 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|----|-------|----|-------|
| 1951 | 71 | 100.0 | 40 | 100.0 | 31 | 100.0 |
| 1952 | 48 | 67.6 | 27 | 67.5 | 21 | 67.7 |
| 1953 | 23 | 32.4 | 13 | 32.5 | 10 | 32.3 |
| 1954 | 15 | 21.1 | 8 | 20.0 | 7 | 22.6 |

Treated Cases - Grouped According to Instructor.

The 188 cases were also grouped according to the instructor of the arithmetic course. The data regarding the return to school of these cases have been included in Table 44.

No significant differences were found between the totals involved nor according to sex when the students were classified according to instructor.

TABLE 44
TREATED GROUP
SCHOOL STATUS OF 188 CASES
BY INSTRUCTOR
1951-1954

| Year | Instructor X | | | Instructor Y | | |
|------|--------------|--------|--------|--------------|--------|--------|
| | Tot. % | M % | F % | Tot. % | M % | F % |
| 1951 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1952 | 74.6 | 71.2 | 76.8 | 61.1 | 66.7 | 56.7 |
| 1953 | 44.0 | 42.3 | 45.1 | 46.3 | 54.2 | 40.0 |
| 1954 | 33.6 | 34.6 | 32.9 | 40.7 | 41.7 | 40.0 |

Study of 66 Cases

Borderline Group. Data on an additional sixty-six students with scores immediately above the scores of the students in the Low Group on the Arithmetic Proficiency Test have been presented in Table 45. These students were not required to enroll in the arithmetic course; that is, they did not receive treatment.

While the rate of return for students in the Borderline Group was lower than the rate of return for students in the Middle Group (Table 36) for the sophomore year, the junior year, and the senior year, it was significantly lower only for the junior year.

For the sophomore year and also for the junior year, the rate of return for students in the Borderline Group was lower than the rate of return for students who received treatment in the form of an arithmetic course (Table 41). But for the senior year the rate of return for the Borderline Group was higher than the rate of return for the treated group. The differences, however, were not significant.

Differences between males and females returning to school in the Borderline Group were not significant.

TABLE 45
BORDERLINE GROUP
SCHOOL STATUS OF 66 CASES
1951-1954

| Year | No. | % | M | % | F | % |
|------|-----|-------|----|-------|----|-------|
| 1951 | 66 | 100.0 | 26 | 100.0 | 40 | 100.0 |
| 1952 | 43 | 65.2 | 16 | 61.5 | 27 | 67.5 |
| 1953 | 27 | 40.9 | 13 | 50.0 | 14 | 35.0 |
| 1954 | 27 | 40.9 | 12 | 46.2 | 15 | 37.5 |

Summary¹I. Study of 612 Cases.

1. Out of 612 cases, composed of freshmen with the 177 highest scores on the Arithmetic Proficiency Test in the fall of 1951, the 203 middle scores, and the 232 lowest scores:

74 per cent returned for the sophomore year;
57 per cent returned for the junior year; and
47 per cent returned for the senior year.

The percentage of males who returned was significantly higher (5 per cent level) than the corresponding percentage of females for the junior year, and also for the senior year.

2. For the High Group of 177 cases:

90 per cent returned for the sophomore year;
80 per cent returned for the junior year; and
70 per cent returned for the senior year.

While the percentage of males who returned to school was noticeably higher than the percentage of females for the junior year, and also for the senior year, the differences were not significant statistically.

¹ The data on attrition have also been summarized in Table I in the Appendix.

3. For the Middle Group of 203 cases:

75 per cent returned for the sophomore year;
60 per cent returned for the junior year; and
49 per cent returned for the senior year.

These percentages were in each case significantly lower than the corresponding percentages for the High Group. In other words, the High Group on the basis of the Arithmetic Proficiency Test was also the high group with respect to its students returning to school.

Differences between males and females returning to school were very slight and were not significant.

4. For the Low Group of 232 cases:

59 per cent returned for the sophomore year;
37 per cent returned for the junior year; and
29 per cent returned for the senior year;

These percentages were in each case significantly lower than the corresponding percentages for the Middle Group. In other words, the Low Group on the basis of the Arithmetic Proficiency Test was also the low group with respect to its students returning to school.

Again, differences between males and females returning to school were rather slight.

4.1 For the 136 single-deficiency cases as compared to the 96 multiple-deficiency cases:

64% returned for the sophomore year as compared to 53%;
46% returned for the junior year as compared to 26%; and
38% returned for the senior year as compared to 16%.

The differences were significant for the junior year, and also for the senior year.

Within the Single-Deficiency Group and within the Multiple-Deficiency Group, there were no significant differences between males and females returning to school.

4.2 For the 188 cases who received treatment in the form of an arithmetic course:

71 per cent returned for the sophomore year;
45 per cent returned for the junior year; and
36 per cent returned for the senior year.

The percentages were in each case somewhat higher than the corresponding percentages for the Low Group as a whole. However, the percentages remained significantly lower (except for the sophomore year) than the corresponding percentages for the Middle Group.

Differences between males and females returning to school were not significant for the cases who received treatment.

4.21 For the 117 treated cases with a single deficiency as compared to the 71 treated cases with multiple deficiencies:

73% returned for the sophomore year as compared to 68%;
52% returned for the junior year as compared to 32%; and
44% returned for the senior year as compared to 21%.

The differences were significant for the junior year, and also for the senior year.

Within the Single-Deficiency Group of treated cases and within the Multiple-Deficiency Group of treated cases, differences between males and females returning to school were not significant.

4.22 For the cases who received treatment in the form of an arithmetic course from Instructor X as compared to Instructor Y:

75% returned for the sophomore year as compared to 61%;
44% returned for the junior year as compared to 46%; and
34% returned for the senior year as compared to 41%.

The differences for the respective years were not significant.

For the instructors individually, there were no significant differences between the return of males and females.

II. Study of 66 Cases.

An additional 66 cases consisted of students with scores immediately above those of the Low Group on The Arithmetic Proficiency Test. These students did not receive treatment in the form of an arithmetic course.

For this Borderline Group:

65 per cent returned for the sophomore year;

41 per cent returned for the junior year; and

41 per cent returned for the senior year.

While the percentages for the Borderline Group were lower than the corresponding percentages for the Middle Group, a significantly lower percentage occurred only for the junior year.

For the sophomore year and also for the junior year, the percentages for the Borderline Group were lower than the corresponding percentages for the treated group. But for the senior year, the percentage for the Borderline Group was higher than the corresponding percentage for the treated group. The differences, however, were not significant.

Differences between males and females returning to school in the Borderline Group were not significant.

Footnotes

1 "Directory of Students," Michigan State College (Office of the Registrar), 1951-52; 1952-53; 1953-54; 1954-55.

2 Ibid.

3 W. G. Warrington, "Some Data from the First Year of the Follow-Through Study of the Students entering Michigan State College in Fall, 1953," Michigan State College (Board of Examiners), Fall 1954, p. 25.

CHAPTER IV

ACHIEVEMENT OF CLINICAL CASES AND NON-CLINICAL CASES

In this chapter, the achievement of certain students has been considered. These students had entered Michigan State University in the fall of 1951. The status of these students at the end of a four-year period, that is, as of the summer of 1955, was studied.

Achievement was interpreted in terms of whether the students had earned the bachelor's degree within this period; whether they were still in school but had not obtained their degrees; or whether they had dropped out of school.

For the students who received degrees, honor status was also considered. For the students who were still in school but had not obtained degrees, the likelihood of graduating was considered. (For these two groupings, the Upper Schools in which the students enrolled were also considered.) For the students who dropped out of school, a determination was made as to whether the students had less than a "C" average as well as whether the students reached an Upper School before dropping out.

The marking system employed by Michigan State University granted a student four points per credit hour for a grade of "A"; three points for a grade of "B"; two points for a grade of "C"; one point for a grade of "D"; and no points for a grade of "F". An average of two points was required for admission to an Upper School, and an average of two points was also required for graduation. An average of 3.00 - 3.39 entitled a student to graduate "With Honor". An average of 3.40 or above entitled a student to graduate "With High Honor".(1)

The achievement of 810 cases was studied.¹ These cases consisted of students with the 270 highest scores on the Arithmetic Proficiency Test in the Fall of 1951, the 270 middle scores, and the 270 lowest scores.

The achievement of transfer students was considered separately from freshmen students. Transfer students were students who had entered Michigan State University in the Fall of 1951 with sophomore status or above. This chapter is concerned primarily with a detailed study of the achievement of the freshmen students. However, the overall achievement of the transfer students has been included as well.

1 The raw data on the achievement of the students in this study were provided by the personnel of the Record Room, Office of the Registrar, Michigan State University.

Within the High Group, a breakdown was made for single-sufficiency cases (students high on only the arithmetic test) and for multiple-sufficiency cases (students also high on the reading test and/or the writing test). Within the Low Group, a breakdown was made for single-deficiency cases (students low on only the arithmetic test) and for multiple-deficiency cases (students also low on the reading test and/or the writing test). In addition, the freshmen who received treatment in the form of an arithmetic course were studied and were grouped according to instructors involved.

Inasmuch as the study was especially concerned with the lower levels of performance on the Arithmetic Proficiency Test, the achievement of an additional eighty-two borderline cases was also considered.² These cases consisted of students with scores immediately above those of the Low Group on the arithmetic test. Their scores were, of course, lower than the scores obtained by the students in the Middle Group. These borderline cases had not received treatment in the form of an arithmetic course.

Unless otherwise indicated, a significant difference is interpreted to mean significant at the 1 per cent level.

2 Ibid.

Study of 810 Cases

Total Group. The 270 highest scores on the Arithmetic Proficiency Test in the fall of 1951 were combined with the 270 middle scores and the 270 lowest scores to form the Total Group. A breakdown of the students according to sex and according to status (freshman or transfer) has been made in Table 46. This breakdown revealed that 198 of the 810 students, or 24.4 per cent, were transfer students. This agreed with the data on new students in general where 734 of the 3,127 new students, or 23.5 per cent were transfer students.

TABLE 46

T-GROUP
FRESHMAN-TRANSFER STATUS OF 810 NEW STUDENTS
FALL 1951

| Group | No. | Totals | | No. | Freshmen | | No. | Transfers | |
|-------|-----|--------|-----|-----|----------|-----|-----|-----------|----|
| | | M | F | | M | F | | M | F |
| L-Gp | 270 | 118 | 152 | 232 | 99 | 133 | 38 | 19 | 19 |
| M-Gp | 270 | 168 | 102 | 203 | 123 | 80 | 67 | 45 | 22 |
| H-Gp | 270 | 191 | 79 | 177 | 118 | 59 | 93 | 73 | 20 |
| Tot. | 810 | 477 | 333 | 612 | 340 | 272 | 198 | 137 | 61 |

In Table 47, the status of the 198 transfer students has been presented. Approximately seven out of every ten transfer students had obtained the bachelor's degree by the summer of 1955. While the percentage of males receiving degrees was higher than the percentage of females, the difference was not significant statistically.

TABLE 47
STATUS OF 198 TRANSFER STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 141 | 71.2 | 102 | 74.4 | 39 | 63.9 |
| Sch. | 4 | 2.0 | 3 | 2.2 | 1 | 1.7 |
| Out | <u>53</u> | <u>26.8</u> | <u>32</u> | <u>23.4</u> | <u>21</u> | <u>34.4</u> |
| Tot. | 198 | 100.0 | 137 | 100.0 | 61 | 100.0 |

Table 48 has been used to present the status of the 612 freshmen at the end of the four-year period. Approximately one out of every three freshmen had actually received the bachelor's degree. No noticeable difference was observed between the percentage of males who received degrees and the percentage of females. Of the 82 cases who were still in school but who had not received degrees, 71 held senior status and appeared likely to graduate.

Thus, the data suggested that approximately one out of every two freshmen would ultimately receive the bachelor's degree. This represented a significantly lower percentage than for the transfer students.

TABLE 48
STATUS OF 612 FRESHMEN STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|------------|-------------|------------|-------------|------------|-------------|
| Deg. | 215 | 35.1 | 116 | 34.1 | 99 | 36.4 |
| Sch. | 82 | 13.4 | 64 | 18.8 | 18 | 6.6 |
| Out | <u>315</u> | <u>51.5</u> | <u>160</u> | <u>47.1</u> | <u>155</u> | <u>57.0</u> |
| Tot. | 612 | 100.0 | 340 | 100.0 | 272 | 100.0 |

In Table 49, a breakdown according to grade-point average has been presented for the 315 freshmen who dropped out of school. Approximately five out of every eight cases had less than a "C" average. The percentage of males with less than a "C" average was significantly higher than the percentage of females. Of the 315 students, 98 (31.1 per cent) reached an Upper School before dropping out - that is, they earned sufficient credits and points to attain junior status.

Some of the 315 students who dropped out of Michigan State University may, of course, have transferred to other colleges, and may have completed the requirements for the bachelor's degree at such colleges.

TABLE 49
GRADE-POINT STATUS OF 315 DROP-OUT CASES
SUMMER 1955

| Ave.* | No. | % | M | % | F | % |
|--------|----------|------------|-------------|------------|----------|----------|
| 0 to 1 | 31 | 9.9 | 19 | 11.9 | 12 | 7.7 |
| 1 to 2 | 168 | 53.3 | 101 | 63.1 | 67 | 43.2 |
| 2 to 3 | 92 | 29.2 | 31 | 19.4 | 61 | 39.4 |
| 3 to 4 | 23 | 7.3 | 8** | 5.0 | 15** | 9.7 |
| 4 | <u>1</u> | <u>0.3</u> | <u>1***</u> | <u>0.6</u> | <u>-</u> | <u>-</u> |
| Tot. | 315 | 100.0 | 160 | 100.0 | 155 | 100.0 |

* In this table and in similar tables, an average of "1" would appear in the "1 to 2" row; an average of "2" would appear in the "2 to 3" row, etc.

** One case with one credit; one case with three credits.

*** One credit only.

Table 50 has been used to present the grade-point average for the 297 freshmen who had either received their degrees or were still in school at the end of the four-year period. A narrower distribution range was observed than in Table 49 due to the requirement of a 2.00 average for graduation.

TABLE 50
GRADE-POINT STATUS OF 297 DEGREE OR SCHOOL CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|-----------|-------------|-----------|-------------|-----------|-------------|
| 1 to 2 | 9 | 3.0 | 7 | 3.9 | 2 | 1.7 |
| 2 to 3 | 207 | 69.7 | 133 | 73.9 | 74 | 63.3 |
| 3 to 4 | <u>81</u> | <u>27.3</u> | <u>40</u> | <u>22.2</u> | <u>41</u> | <u>35.0</u> |
| Tot. | 297 | 100.0 | 180 | 100.0 | 117 | 100.0 |

In Table 51, data have been presented on those students who actually graduated with honors out of the original 612 freshmen studied. Approximately one out of every eight freshmen in the study was able to graduate with honors. The percentage of females who graduated with honors was slightly higher than the percentage of males.

TABLE 51
DISTRIBUTION OF 79 HONOR STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|-----------|-----|------|-----|------|-----|------|
| Sample | 612 | | 340 | | 272 | |
| Honor | 49 | 8.0 | 22 | 6.5 | 27 | 9.9 |
| High Hon. | 30 | 4.9 | 16 | 4.7 | 14 | 5.2 |
| H + HH | 79 | 12.9 | 38 | 11.2 | 41 | 15.1 |

In Table 52, a distribution according to Upper Schools has been made for the 215 students who received degrees and also for the 82 students still in school.

TABLE 52
DISTRIBUTION OF 297 STUDENTS BY SCHOOLS

| Sch. | No. | Degrees | | No. | In School | |
|-------|-----|---------|----|-----|-----------|----|
| | | M | F | | M | F |
| Ag. | 19 | 17 | 2 | 10 | 9 | 1 |
| BPS | 43 | 29 | 14 | 18 | 16 | 2 |
| Ed. | 29 | 2 | 27 | 9 | 6 | 3 |
| Eng. | 26 | 25 | 1 | 17 | 17 | - |
| H.E. | 18 | - | 18 | 1 | - | 1 |
| S&A | 71 | 38 | 33 | 22 | 12 | 10 |
| V.M. | 9 | 5 | 4 | - | - | - |
| Basic | - | - | - | 5 | 4 | 1 |
| Tot. | 215 | 116 | 99 | 82 | 64 | 18 |

The division of the 215 degrees among Bachelor of Arts, Bachelor of Science, and Bachelor of Music has been indicated in Table 53. A similar division for the entire 2,516 graduates listed in the June 1955 Commencement program has been included as well. The Commencement program included all degrees issued during the school year 1954-55, but did not indicate honor status of the 1955 summer school candidates.(2)

Slightly over half of the degrees granted were Bachelor of Arts, and slightly under half of the degrees granted were Bachelor of Science. The degrees for the males were rather evenly divided between Bachelor of Arts and Bachelor of Science. However, for the females, approximately two out of every three degrees were Bachelor of Arts.

TABLE 53
DISTRIBUTION OF DEGREES BY SCHOOLS
AND ACCORDING TO TYPE OF DEGREE
JUNE 1955

| Sch. | 215 Degrees* | | | | | | 2,516 Degrees** | | | | | |
|------|--------------|-----|----|-----|-----|----|-----------------|------|-----|------|------|-----|
| | BA | M | F | BS | M | F | BA | M | F | BS | M | F |
| Ag. | - | - | - | 19 | 17- | 2 | - | - | - | 255 | 251- | 4 |
| BPS | 41 | 29- | 12 | 2 | - | 2 | 644 | 532- | 112 | 43 | 36- | 7 |
| Ed. | 23 | - | 23 | 6 | 2- | 4 | 242 | 12- | 230 | 86 | 64- | 22 |
| Eng. | - | - | - | 26 | 25- | 1 | - | - | - | 277 | 276- | 1 |
| H.E. | - | - | - | 18 | - | 18 | - | - | - | 131 | 1- | 130 |
| S&A | 46 | 22- | 24 | 21 | 13- | 8 | 540 | 299- | 241 | 179 | 147- | 32 |
| V.M. | - | - | - | 9 | 5- | 4 | - | - | - | 88 | 65- | 23 |
| Tot. | 110 | 51- | 59 | 101 | 62- | 39 | 1426 | 843- | 583 | 1059 | 840- | 219 |
| % | 51 | 24- | 27 | 47 | 29- | 18 | 57 | 34- | 23 | 42 | 33- | 9 |

* Includes 3-1 BM, S&A. ** Includes 14-17 BM, S&A.

In Table 54, a distribution according to Upper Schools has been made for the 79 honor students included in the 215 degrees. Approximately three out of every eight degrees granted were with honors. Of the 116 male graduates in the sample, 38 students (32.8 per cent) graduated with honors as compared to 41 honor students (41.4 per cent) from the 99 females. The difference between these percentages was not significant. These 215 degrees involved, of course, only students who had entered Michigan State University as freshmen in the fall of 1951.

TABLE 54
DISTRIBUTION OF 215 DEGREES
AND 79 HONOR STUDENTS
BY SCHOOLS

| Sch. | Deg. | H+HH | % | H | % | HH | % |
|------|----------|----------|-------------|----------|-------------|----------|-------------|
| Ag. | 19 | 6 | 31.5 | 2 | 10.5 | 4 | 21.0 |
| BPS | 43 | 13 | 30.2 | 11 | 25.6 | 2 | 4.6 |
| Ed. | 29 | 7 | 24.1 | 5 | 17.2 | 2 | 6.9 |
| Eng. | 26 | 13 | 50.0 | 8 | 30.8 | 5 | 19.2 |
| H.E. | 18 | 7 | 38.9 | 6 | 33.3 | 1 | 5.6 |
| S&A | 71 | 29 | 40.8 | 16 | 22.5 | 13 | 18.3 |
| V.M. | <u>9</u> | <u>4</u> | <u>44.4</u> | <u>1</u> | <u>11.1</u> | <u>3</u> | <u>33.3</u> |
| Tot. | 215 | 79 | 36.7 | 49 | 22.8 | 30 | 13.9 |

A distribution of the entire 2,516 degrees according to Upper Schools and of the 386 honor students was tabulated from the June 1955 Commencement program and has been included in Table 55.(3) The percentage of all graduates who received honors was 15.3 as compared to 36.7 per cent for the sample studied.

The sample of 612 cases was composed of a High Group, a Middle Group, and a Low Group based on results on the Arithmetic Proficiency Test. The respective percentages of students with honors among the 215 degree recipients for the three groups were 65.3, 17.7, and 7.3. Thus, the influence of the High Group caused the sample to show an unusually high percentage of honor students.

The 2,516 degrees issued during the school year 1954-1955 included not only students who had entered Michigan State University as freshmen in the fall of 1951, but also students who had transferred to Michigan State University in the intervening period and had become eligible for degrees during the school year 1954-1955.

Of the 1,697 male graduates, 202 students (11.9 per cent) graduated with honors, as compared to 184 honor students (22.4 per cent) from the 819 females. This represented a significant difference favoring the females. A similar situation prevailed when the honor students were broken down into the categories "With Honor" and "With High Honor".

Likewise, when honors students were separated according to Bachelor of Arts and Bachelor of Science degrees, in each case the percentage of degrees with honors for the females was significantly higher than for the males.

The percentage of Bachelor of Science degrees with honors for the males was significantly higher than the percentage of Bachelor of Arts degrees with honors for the males. However, no significant difference was found between Bachelor of Science and Bachelor of Arts degrees with honors for the females.

TABLE 55
DISTRIBUTION OF 2,516 DEGREES
AND 386 HONOR STUDENTS
BY SCHOOLS

| Sch. | Deg. | H+HH | % | H | % | HH | % |
|------|-----------|-----------|-------------|-----------|-------------|----------|------------|
| Ag. | 255 | 29 | 11.4 | 17 | 6.7 | 12 | 4.7 |
| BPS | 687 | 70 | 10.2 | 50 | 7.3 | 20 | 2.9 |
| Ed. | 328 | 51 | 15.5 | 46 | 14.0 | 5 | 1.5 |
| Eng. | 277 | 43 | 15.5 | 28 | 10.1 | 15 | 5.4 |
| H.E. | 131 | 22 | 16.8 | 18 | 13.7 | 4 | 3.1 |
| S&A | 750 | 143 | 19.1 | 98 | 13.1 | 45 | 6.0 |
| V.M. | <u>88</u> | <u>28</u> | <u>31.8</u> | <u>21</u> | <u>23.9</u> | <u>7</u> | <u>7.9</u> |
| Tot. | 2516 | 386 | 15.3 | 278 | 11.0 | 108 | 4.3 |

High Group. The High Group consisted of the 270 students who scored highest on the Arithmetic Proficiency Test in the fall of 1951. Of the 270 students, 93 students, or 34.4 per cent, were transfer students.

In Table 56, the status of these 93 transfer students has been presented. Approximately three out of every four transfer students had obtained bachelor's degrees by the summer of 1955. The percentage for the male transfer students was significantly higher (5 per cent level) than for the females.

TABLE 56
STATUS OF 93 TRANSFER STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|-----------|-------------|----------|-------------|
| Deg. | 69 | 74.2 | 58 | 79.5 | 11 | 55.0 |
| Sch. | - | - | - | - | - | - |
| Out | <u>24</u> | <u>25.8</u> | <u>15</u> | <u>20.5</u> | <u>9</u> | <u>45.0</u> |
| Tot. | 93 | 100.0 | 73 | 100.0 | 20 | 100.0 |

In Table 57, the status of the 177 freshmen has been presented. Slightly more than one-half of the freshmen in the High Group had received their degrees by the end of the four-year period. Of an additional 31 cases who were still in school, 29 held senior status. Thus, it appeared that approximately seven out of every ten freshmen in the High Group would receive the bachelor's degree.

TABLE 57
STATUS OF 177 FRESHMEN STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 95 | 53.7 | 59 | 50.0 | 36 | 61.0 |
| Sch. | 31 | 17.5 | 28 | 23.7 | 3 | 5.1 |
| Out | <u>51</u> | <u>28.8</u> | <u>31</u> | <u>26.3</u> | <u>20</u> | <u>33.9</u> |
| Tot. | 177 | 100.0 | 118 | 100.0 | 59 | 100.0 |

In Table 58, a breakdown according to grade-point average has been presented for the 51 freshmen who dropped out of school. In approximately one out of every four cases, these students had less than a "C" average. Of the 51 students, 31 students, or 60.8 per cent, reached an Upper School before dropping out.

TABLE 58
GRADE-POINT STATUS OF 51 DROP-OUT CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|-----------|-------------|----------|-------------|----------|-------------|
| 0 to 1 | 2 | 3.9 | 1 | 3.2 | 1 | 5.0 |
| 1 to 2 | 12 | 23.5 | 10 | 32.3 | 2 | 10.0 |
| 2 to 3 | 23 | 45.1 | 14 | 45.2 | 9 | 45.0 |
| 3 to 4 | <u>14</u> | <u>27.5</u> | <u>6</u> | <u>19.3</u> | <u>8</u> | <u>40.0</u> |
| Tot. | 51 | 100.0 | 31 | 100.0 | 20 | 100.0 |

Table 59 has been used to present the grade-point average for the 126 freshmen who had either received their degrees or were still in school at the end of the four-year period.

TABLE 59
GRADE-POINT STATUS OF 126 DEGREE OR SCHOOL CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|-----------|-------------|-----------|-------------|-----------|-------------|
| 1 to 2 | - | - | - | - | - | - |
| 2 to 3 | 63 | 50.0 | 55 | 63.2 | 8 | 20.5 |
| 3 to 4 | <u>63</u> | <u>50.0</u> | <u>32</u> | <u>36.8</u> | <u>31</u> | <u>79.5</u> |
| Tot. | 126 | 100.0 | 87 | 100.0 | 39 | 100.0 |

In Table 60, data have been presented on those students who graduated with honors out of the original 177 freshmen in the High Group. Approximately one out of every three freshmen in the High Group was able to graduate with honors. A significantly higher percentage of females graduated with honor than males.

TABLE 60
DISTRIBUTION OF 62 HONOR STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|-----------|-----|------|-----|------|----|------|
| Sample | 177 | | 118 | | 59 | |
| Honor | 35 | 19.8 | 18 | 15.3 | 17 | 28.8 |
| High Hon. | 27 | 15.2 | 13 | 11.0 | 14 | 23.7 |
| H + HH | 62 | 35.0 | 31 | 26.3 | 31 | 52.5 |

In Table 61, a distribution according to Upper Schools has been made for the 95 students who received degrees and also for the 31 students still in school.

TABLE 61
DISTRIBUTION OF 126 STUDENTS BY SCHOOLS

| Sch. | No. | Degrees | | F | In School | | F |
|------|-----|---------|--|----|-----------|----|---|
| | | M | | | No. | M | |
| Ag. | 9 | 7 | | 2 | 3 | 2 | 1 |
| BPS | 17 | 10 | | 7 | 5 | 5 | - |
| Ed. | 8 | 2 | | 6 | 3 | 2 | 1 |
| Eng. | 22 | 21 | | 1 | 14 | 14 | - |
| H.E. | 2 | - | | 2 | - | - | - |
| S&A | 29 | 14 | | 15 | 6 | 5 | 1 |
| V.M. | 8 | 5 | | 3 | - | - | - |
| Tot. | 95 | 59 | | 36 | 31 | 28 | 3 |

In Table 62, a distribution according to Upper Schools has been made for the 62 honor students (31 males and 31 females) included in the 95 degrees. Approximately two out of every three degrees granted in the High Group were with honors. The percentage of degrees with honors for males (52.5 per cent) was significantly lower than for females (86.1 per cent).

TABLE 62
DISTRIBUTION OF 95 DEGREES
AND 62 HONOR STUDENTS
BY SCHOOLS

| Sch. | Deg. | Honors | % |
|------|----------|----------|-------------|
| Ag. | 9 | 4 | 44.4 |
| BPS | 17 | 11 | 64.7 |
| Ed. | 8 | 5 | 62.5 |
| Eng. | 22 | 12 | 54.5 |
| H.E. | 2 | 2 | 100.0 |
| S&A | 29 | 24 | 82.8 |
| V.M. | <u>8</u> | <u>4</u> | <u>50.0</u> |
| Tot. | 95 | 62 | 65.3 |

Of the 177 freshmen with high scores on the Arithmetic Proficiency Test, approximately two out of every five students were high in more than one area. Some twenty-six students were high on both the reading test and the arithmetic test; twenty-four students were high on both the writing test and the arithmetic test; and nineteen students were high on all three tests. These sixty-nine multiple-sufficiency cases included thirty-four males and thirty-five females. Of the 118 males in the High Group, 23.8 per cent were high in more than one area as compared to 61.0 per cent of the fifty-nine females. This percentage difference, favoring the females, was significant. In fact, of the nineteen students who were high in all three areas, sixteen were females.

A comparison of the sixty-nine students who were high in more than one area with the remaining 108 students who were high in arithmetic only revealed that approximately one-half of the former group graduated with honors as compared to one-fourth of the latter. This represented a significant difference favoring the multiple-sufficiency cases. In fact, 30 per cent of those students graduated "With High Honor", as compared to 6 per cent of the students who were high in arithmetic only. A more detailed breakdown on the achievement of the multiple-sufficiency cases and the single-sufficiency cases has been included in Tables II - V in the Appendix.

Middle Group. The Middle Group consisted of the 270 students who had middle scores on the Arithmetic Proficiency Test in the fall of 1951. Of the 270 students, 67 students, or 24.8 per cent, were transfer students.

In Table 63, the status of these 67 transfer students has been presented. Approximately three out of every four transfer students in this group had obtained the bachelor's degree by the summer of 1955.

TABLE 63
STATUS OF 67 TRANSFER STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|-----------|-------------|----------|-------------|
| Deg. | 50 | 74.6 | 33 | 73.3 | 17 | 77.3 |
| Sch. | 2 | 3.0 | 2 | 4.5 | - | - |
| Out | <u>15</u> | <u>22.4</u> | <u>10</u> | <u>22.2</u> | <u>5</u> | <u>22.7</u> |
| Tot. | 67 | 100.0 | 45 | 100.0 | 22 | 100.0 |

In Table 64, the status of the 203 freshmen has been presented. The percentage of freshmen who received degrees in the Middle Group was significantly lower than the percentage from the High Group.

Approximately two out of every five freshmen in the Middle Group had received their degrees at the end of the four-year period. Of an additional 24 cases who were still in school, 22 held senior status. Thus, it appeared that approximately one-half of the freshmen in the Middle Group would receive the bachelor's degree.

TABLE 64
STATUS OF 203 FRESHMEN STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|------------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 79 | 38.9 | 44 | 35.8 | 35 | 43.8 |
| Sch. | 24 | 11.8 | 18 | 14.6 | 6 | 7.5 |
| Out | <u>100</u> | <u>49.3</u> | <u>61</u> | <u>49.6</u> | <u>39</u> | <u>48.7</u> |
| Tot. | 203 | 100.0 | 123 | 100.0 | 80 | 100.0 |

In Table 65, a breakdown according to grade-point average has been presented for the 100 students who dropped out of school. In seven out of every ten cases, these students had less than a "C" average. This represented a significantly higher percentage than for the High Group. The percentage of males in the Middle Group with less than a "C" average was significantly higher than for females. Of the 100 students, 26 per cent reached an Upper School before dropping out. This was a significantly lower percentage than for the High Group.

TABLE 65
GRADE-POINT STATUS OF 100 DROP-OUT CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|------------|----------|------------|----------|------------|
| 0 to 1 | 8 | 8.0 | 6 | 9.8 | 2 | 5.1 |
| 1 to 2 | 62 | 62.0 | 43 | 70.5 | 19 | 48.7 |
| 2 to 3 | 27 | 27.0 | 11 | 18.0 | 16 | 41.1 |
| 3 to 4 | <u>3</u> | <u>3.0</u> | <u>1</u> | <u>1.7</u> | <u>2</u> | <u>5.1</u> |
| Tot. | 100 | 100.0 | 61 | 100.0 | 39 | 100.0 |

Table 66 has been used to present the grade-point average for the 103 freshmen who had either received their degrees or were still in school at the end of the four-year period.

TABLE 66
GRADE-POINT STATUS OF 103 DEGREE OR SCHOOL CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|-----------|-------------|----------|-------------|----------|-------------|
| 1 to 2 | 2 | 1.9 | 2 | 3.2 | - | - |
| 2 to 3 | 86 | 83.5 | 53 | 85.5 | 33 | 80.5 |
| 3 to 4 | <u>15</u> | <u>14.6</u> | <u>7</u> | <u>11.3</u> | <u>8</u> | <u>19.5</u> |
| Tot. | 103 | 100.0 | 62 | 100.0 | 41 | 100.0 |

In Table 67, data have been presented on those students who graduated with honors out of the original 203 freshmen in the Middle Group. Approximately one out of every fourteen freshmen in the Middle Group was able to graduate with honors. While a lower percentage of males graduated with honors than females, the difference was not significant.

TABLE 67
DISTRIBUTION OF 14 HONOR STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|-----------|-----|-----|-----|-----|----|------|
| Sample | 203 | | 123 | | 80 | |
| Honor | 11 | 5.4 | 3 | 2.4 | 8 | 10.0 |
| High Hon. | 3 | 1.5 | 3 | 2.4 | - | - |
| H + HH | 14 | 6.9 | 6 | 4.9 | 8 | 10.0 |

In Table 68, a distribution according to Upper Schools has been made for the 79 students who received degrees and also for the 24 students still in school.

TABLE 68
DISTRIBUTION OF 103 STUDENTS BY SCHOOLS

| Sch. | No. | Degrees | | No. | In School | |
|------|----------|----------|----------|----------|-----------|----------|
| | | M | F | | M | F |
| Ag. | 9 | 9 | - | 3 | 3 | - |
| BPS | 22 | 17 | 5 | 6 | 5 | 1 |
| Ed. | 8 | - | 8 | 4 | 3 | 1 |
| Eng. | 4 | 4 | - | 3 | 3 | - |
| H.E. | 14 | - | 14 | 1 | - | 1 |
| S&A | 21 | 14 | 7 | 7 | 4 | 3 |
| V.M. | <u>1</u> | <u>-</u> | <u>1</u> | <u>-</u> | <u>-</u> | <u>-</u> |
| Tot. | 79 | 44 | 35 | 24 | 18 | 6 |

In Table 69, a distribution according to Upper Schools has been made for the 14 honor students (six males - eight females) included in the 79 degrees. Approximately one out of every five degrees granted in the Middle Group was with honors. The percentage of degrees with honors for males (13.6 per cent) was not significantly different from the percentage for females (22.9 per cent).

TABLE 69
DISTRIBUTION OF 79 DEGREES
AND 14 HONOR STUDENTS
BY SCHOOLS

| Sch. | Deg. | Honors | % |
|------|----------|----------|----------|
| Ag. | 9 | 2 | 22.2 |
| BPS | 22 | 2 | 9.1 |
| Ed. | 8 | 1 | 12.5 |
| Eng. | 4 | 1 | 25.0 |
| H.E. | 14 | 5 | 35.7 |
| S&A | 21 | 3 | 14.3 |
| V.M. | <u>1</u> | <u>-</u> | <u>-</u> |
| Tot. | 79 | 14 | 17.7 |

Low Group. The Low Group consisted of the 270 students with the lowest scores on the Arithmetic Proficiency Test in the fall of 1951. Of the 270 students, 38 students, or 14.1 per cent, were transfer students.

In Table 70, the status of these 38 transfer students has been presented. Approximately three out of every five transfer students in this group had obtained the bachelor's degree by the summer of 1955.

TABLE 70
STATUS OF 38 TRANSFER STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|----------|-------------|----------|-------------|
| Deg. | 22 | 57.9 | 11 | 57.9 | 11 | 57.9 |
| Sch. | 2 | 5.3 | 1 | 5.3 | 1 | 5.3 |
| Out | <u>14</u> | <u>36.8</u> | <u>7</u> | <u>36.8</u> | <u>7</u> | <u>36.8</u> |
| Tot. | 38 | 100.0 | 19 | 100.0 | 19 | 100.0 |

In Table 71, the status of the 232 freshmen has been presented. The percentage of freshmen who received degrees in the Low Group was significantly lower than the percentage from the Middle Group.

Approximately one out of every five freshmen in the Low Group had received the bachelor's degree at the end of the four-year period. Of an additional 27 cases still in school, 20 held senior status. Thus, it appeared that approximately three out of every ten freshmen in the Low Group would receive the Bachelor's degree.

TABLE 71
STATUS OF 232 FRESHMEN STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|------------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 41 | 17.7 | 13 | 13.1 | 28 | 21.0 |
| Sch. | 27 | 11.6 | 18 | 18.2 | 9 | 6.8 |
| Out | <u>164</u> | <u>70.7</u> | <u>68</u> | <u>68.7</u> | <u>96</u> | <u>72.2</u> |
| Tot. | 232 | 100.0 | 99 | 100.0 | 133 | 100.0 |

In Table 72, a breakdown according to grade-point average has been presented for the 164 freshmen who dropped out of school. In approximately seven out of every ten cases, these students had less than a "C" average. The percentage of males in the Low Group with less than a "C" average was significantly higher than for females. Of the 164 students, 41 students, or 25.0 per cent reached an Upper School before dropping out.

TABLE 72
GRADE-POINT STATUS OF 164 DROP-OUT CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|------------|------------|------------|----------|----------|
| 0 to 1 | 21 | 12.8 | 12 | 17.6 | 9 | 9.4 |
| 1 to 2 | 94 | 57.3 | 48 | 70.6 | 46 | 47.9 |
| 2 to 3 | 42 | 25.6 | 6 | 8.8 | 36 | 37.5 |
| 3 to 4 | 6 | 3.7 | 1* | 1.5 | 5* | 5.2 |
| 4 | <u>1</u> | <u>0.6</u> | <u>1**</u> | <u>1.5</u> | <u>-</u> | <u>-</u> |
| Tot. | 164 | 100.0 | 68 | 100.0 | 96 | 100.0 |

* One case with one credit; one case with three credits.

** One credit only.

Table 73 has been used to present the grade-point average for the 68 freshmen who had either received their degrees or were still in school at the end of the four-year period.

TABLE 73
GRADE-POINT STATUS OF 68 DEGREE OR SCHOOL CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|------------|----------|------------|----------|------------|
| 1 to 2 | 7 | 10.3 | 5 | 16.1 | 2 | 5.4 |
| 2 to 3 | 58 | 85.3 | 25 | 80.7 | 33 | 89.2 |
| 3 to 4 | <u>3</u> | <u>4.4</u> | <u>1</u> | <u>3.2</u> | <u>2</u> | <u>5.4</u> |
| Tot. | 68 | 100.0 | 31 | 100.0 | 37 | 100.0 |

In Table 74, data have been presented on those students who graduated with honors out of the original 232 freshmen in the Low Group. Approximately one out of every one hundred freshmen in the Low Group was able to graduate "With Honor". No student from the Low Group was able to graduate "With High Honor".

TABLE 74
DISTRIBUTION OF 3 HONOR STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|-----------|-----|-----|----|-----|-----|-----|
| Sample | 232 | | 99 | | 133 | |
| Honor | 3 | 1.3 | 1 | 1.0 | 2 | 1.5 |
| High Hon. | - | - | - | - | - | - |
| H + HH | 3 | 1.3 | 1 | 1.0 | 2 | 1.5 |

In Table 75, a distribution according to Upper Schools has been made for the 41 students who received degrees and also for the 27 students still in school. No students from the Low Group received degrees in Engineering or Veterinary Medicine.

TABLE 75
DISTRIBUTION OF 68 STUDENTS BY SCHOOLS

| Sch. | No. | Degrees | | No. | In School | |
|-------|-----|---------|----|-----|-----------|---|
| | | M | F | | M | F |
| Ag. | 1 | 1 | - | 4 | 4 | - |
| BPS | 4 | 2 | 2 | 7 | 6 | 1 |
| Ed. | 13 | - | 13 | 2 | 1 | 1 |
| Eng. | - | - | - | - | - | - |
| H.E. | 2 | - | 2 | - | - | - |
| S&A | 21 | 10 | 11 | 9 | 3 | 6 |
| V.M. | - | - | - | - | - | - |
| B.C.* | - | - | - | 5 | 4 | 1 |
| Tot. | 41 | 13 | 28 | 27 | 18 | 9 |

* Basic College.

In Table 76, a distribution according to Upper Schools has been made for the three honor students (one male - two females) included in the 41 degrees. Approximately one out of every fourteen degrees granted in the Low Group was with honors. The percentage of degrees with honors for males (7.7 per cent) was not significantly different from the percentage for females (7.1 per cent).

TABLE 76
DISTRIBUTION OF 41 DEGREES
AND 3 HONOR STUDENTS
BY SCHOOLS

| Sch. | Deg. | Honors | % |
|------|----------|----------|----------|
| Ag. | 1 | - | - |
| BPS | 4 | - | - |
| Ed. | 13 | 1 | 7.7 |
| Eng. | - | - | - |
| H.E. | 2 | - | - |
| S&A | 21 | 2 | 9.5 |
| V.M. | <u>-</u> | <u>-</u> | <u>-</u> |
| Tot. | 41 | 3 | 7.3 |

Single-Deficiency Cases (136) versus Multiple-Deficiency Cases (96). The Low Group on the Arithmetic Proficiency Test was broken up into arithmetic-only deficiency cases and multiple-deficiency cases - arithmetic and reading, arithmetic and writing, and arithmetic, reading, and writing. In Table 77, the breakdown has been shown for both freshmen and transfer students in the Low Group. This revealed that the problem of multiple deficiencies was rather negligible for transfer students.

For freshmen with low scores on the Arithmetic Proficiency Test, approximately two out of every five were multiple-deficiency cases. Of the 99 males, 55.6 per cent were low in more than one area as compared to 30.8 per cent of the 133 females. The difference was significant.

TABLE 77
SINGLE AND MULTIPLE-DEFICIENCY STATUS
OF 270 NEW STUDENTS
FALL 1951

| | No. | Freshmen | | | Transfers | |
|------|-----|----------|-----|-----|-----------|----|
| | | M | F | No. | M | F |
| S-D | 136 | 44 | 92 | 35 | 17 | 18 |
| M-D | 96 | 55 | 41 | 3 | 2 | 1 |
| Tot. | 232 | 99 | 133 | 38 | 19 | 19 |

Single-Deficiency Cases. In Table 78, the status of the 136 freshmen with a single deficiency (arithmetic only) has been presented. Approximately one out of every four of these students had received the bachelor's degree at the end of the four-year period. Of an additional 18 cases still in school, 14 held senior status. Thus, it appeared that approximately one out of every three freshmen with an arithmetic-only deficiency would receive the bachelor's degree.

TABLE 78
STATUS OF 136 SINGLE-DEFICIENCY CASES
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 31 | 22.8 | 9 | 20.5 | 22 | 23.9 |
| Sch. | 18 | 13.2 | 11 | 25.0 | 7 | 7.6 |
| Out | <u>87</u> | <u>64.0</u> | <u>24</u> | <u>54.5</u> | <u>63</u> | <u>68.5</u> |
| Tot. | 136 | 100.0 | 44 | 100.0 | 92 | 100.0 |

In Table 79, a breakdown according to grade-point average has been presented for the 87 students who dropped out of school. In approximately five out of every nine cases, these students had less than a "C" average. The percentage of males with less than a "C" average was significantly higher than for females. Of the 87 students, 27 students, or 31.0 per cent, reached an Upper School before dropping out.

TABLE 79
GRADE-POINT STATUS OF 87 DROP-OUT CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|------------|-----------|------------|-----------|------------|
| 0 to 1 | 7 | 8.0 | 4 | 16.7 | 3 | 4.8 |
| 1 to 2 | 40 | 46.0 | 16 | 66.7 | 24 | 38.1 |
| 2 to 3 | 34 | 39.1 | 3 | 12.5 | 31 | 49.2 |
| 3 to 4 | <u>6</u> | <u>6.9</u> | <u>1*</u> | <u>4.1</u> | <u>5*</u> | <u>7.9</u> |
| Tot. | 87 | 100.0 | 24 | 100.0 | 63 | 100.0 |

* One case with one credit; one case with three credits.

Table 80 has been used to present the grade-point average for the 49 freshmen who had either received their degrees or were still in school at the end of the four-year period.

TABLE 80
GRADE-POINT STATUS OF 49 DEGREE OR SCHOOL CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|------------|----------|------------|----------|------------|
| 1 to 2 | 4 | 8.2 | 3 | 15.0 | 1 | 3.4 |
| 2 to 3 | 42 | 85.7 | 16 | 80.0 | 26 | 89.7 |
| 3 to 4 | <u>3</u> | <u>6.1</u> | <u>1</u> | <u>5.0</u> | <u>2</u> | <u>6.9</u> |
| Tot. | 49 | 100.0 | 20 | 100.0 | 29 | 100.0 |

In Table 81, data have been presented on those students who graduated with honors out of the original 136 freshmen with a single deficiency. Approximately two out of every one hundred freshmen in this category were able to graduate "With Honor". No student from this group was able to graduate "With High Honor".

TABLE 81
DISTRIBUTION OF 3 S-D HONOR STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|-----------|-----|-----|----|-----|----|-----|
| Sample | 136 | | 44 | | 92 | |
| Honor | 3 | 2.2 | 1 | 2.3 | 2 | 2.2 |
| High Hon. | - | - | - | - | - | - |
| H + HH | 3 | 2.2 | 1 | 2.3 | 2 | 2.2 |

In Table 82, a distribution according to Upper Schools has been made for the 31 students who received degrees and also for the 18 students still in school. No students from the Single-Deficiency Group received degrees in Agriculture, Engineering, or Veterinary Medicine.

TABLE 82
DISTRIBUTION OF 49 STUDENTS BY SCHOOLS

| Sch. | No. | Degrees | | No. | In School | |
|-------|-----|---------|----|-----|-----------|---|
| | | M | F | | M | F |
| Ag. | - | - | - | 2 | 2 | - |
| BPS | 4 | 2 | 2 | 5 | 4 | 1 |
| Ed. | 9 | - | 9 | 1 | - | 1 |
| Eng. | - | - | - | - | - | - |
| H.E. | 1 | - | 1 | - | - | - |
| S&A | 17 | 7 | 10 | 7 | 2 | 5 |
| V.M. | - | - | - | - | - | - |
| B.C.* | - | - | - | 3 | 3 | - |
| Tot. | 31 | 9 | 22 | 18 | 11 | 7 |

* Basic College.

In Table 83, a distribution according to Upper Schools has been made for the three honor students (one male - two females) included in the 31 degrees. Approximately one out of every ten degrees granted in the Single-Deficiency Group was with honors.

TABLE 83
DISTRIBUTION OF 31 DEGREES
AND 3 HONOR STUDENTS
BY SCHOOLS

| Sch. | Deg. | Honors | % |
|------|----------|----------|----------|
| Ag. | - | - | - |
| BPS | 4 | - | - |
| Ed. | 9 | 1 | 11.1 |
| Eng. | - | - | - |
| H.E. | 1 | - | - |
| S&A | 17 | 2 | 11.8 |
| V.M. | <u>-</u> | <u>-</u> | <u>-</u> |
| Tot. | 31 | 3 | 9.7 |

Multiple Deficiency Cases. While the numbers were relatively small, the status of the students from the three multiple-deficiency groups - arithmetic and reading, arithmetic and writing, and arithmetic, reading, and writing - has been presented in Table 84. At the end of the four-year period, seven of the forty-one students with a deficiency in arithmetic and reading had received the bachelor's degree. For the arithmetic and writing group, one of the twenty-three students had received a degree. Finally, for the arithmetic, reading, and writing group, two of the thirty-two students had received degrees.

TABLE 84
STATUS OF 96 MULTIPLE-DEFICIENCY CASES
GROUPED BY TYPE OF DEFICIENCY
SUMMER 1955

| | No. | AR M | F | No. | AW M | F | No. | ARW M | F |
|------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|----------|
| Deg. | 7 | 3 | 4 | 1 | 1 | - | 2 | - | 2 |
| Sch. | 3 | 2 | 1 | 3 | 3 | - | 3 | 2 | 1 |
| Out | <u>31</u> | <u>13</u> | <u>18</u> | <u>19</u> | <u>12</u> | <u>7</u> | <u>27</u> | <u>19</u> | <u>8</u> |
| Tot. | 41 | 18 | 23 | 23 | 16 | 7 | 32 | 21 | 11 |

In Table 85, the overall status of the 96 multiple-deficiency cases has been presented. The percentage of multiple-deficiency cases who received degrees was significantly lower than the percentage of single-deficiency cases. Approximately one out of every ten of the multiple-deficiency cases had received the bachelor's degree at the end of the four-year period. Of an additional nine cases still in school, six held senior status. Thus, it appeared that approximately one out of every five freshmen with multiple deficiencies would receive the bachelor's degree.

TABLE 85
STATUS OF 96 MULTIPLE-DEFICIENCY CASES
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 10 | 10.4 | 4 | 7.3 | 6 | 14.6 |
| Sch. | 9 | 9.4 | 7 | 12.7 | 2 | 4.9 |
| Out | <u>77</u> | <u>80.2</u> | <u>44</u> | <u>80.0</u> | <u>33</u> | <u>80.5</u> |
| Tot. | 96 | 100.0 | 55 | 100.0 | 41 | 100.0 |

In Table 86, a breakdown according to grade-point average has been presented for the 77 students who dropped out of school. In approximately seven out of every eight cases, these students had less than a "C" average. No significant difference was observed between the percentage of males and the percentage of females with less than a "C" average. Of the 77 students, 14 students, or 18.2 per cent reached an Upper School before dropping out.

TABLE 86
GRADE-POINT STATUS OF 77 DROP-OUT CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|------------|-----------|------------|----------|----------|
| 0 to 1 | 14 | 18.2 | 8 | 18.2 | 6 | 18.2 |
| 1 to 2 | 54 | 70.1 | 32 | 72.7 | 22 | 66.7 |
| 2 to 3 | 8 | 10.4 | 3 | 6.8 | 5 | 15.1 |
| 3 to 4 | - | - | - | - | - | - |
| 4 | <u>1</u> | <u>1.3</u> | <u>1*</u> | <u>2.3</u> | <u>-</u> | <u>-</u> |
| Tot. | 77 | 100.0 | 44 | 100.0 | 33 | 100.0 |

* One credit only.

Table 87 has been used to present the grade-point average for the nineteen students who had either received their degrees or were still in school at the end of the four-year period. None of the ninety-six students with a multiple deficiency graduated with honors.

TABLE 87
GRADE-POINT STATUS OF 19 DEGREE OR SCHOOL CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|----------|----------|----------|----------|----------|
| 1 to 2 | 3 | 15.8 | 2 | 18.2 | 1 | 12.5 |
| 2 to 3 | 16 | 84.2 | 9 | 81.8 | 7 | 87.5 |
| 3 to 4 | <u>-</u> | <u>-</u> | <u>-</u> | <u>-</u> | <u>-</u> | <u>-</u> |
| Tot. | 19 | 100.0 | 11 | 100.0 | 8 | 100.0 |

In Table 88, a distribution according to Upper Schools has been made for the 10 students who received degrees and also for the nine students still in school. No students from the Multiple-Deficiency Group received degrees in Business and Public Service, Engineering, or Veterinary Medicine.

TABLE 88
DISTRIBUTION OF 19 STUDENTS BY SCHOOLS

| Sch. | No. | Degrees | | No. | In School | |
|-------|-----|---------|---|-----|-----------|---|
| | | M | F | | M | F |
| Ag. | 1 | 1 | - | 2 | 2 | - |
| BPS | - | - | - | 2 | 2 | - |
| Ed. | 4 | - | 4 | 1 | 1 | - |
| Eng. | - | - | - | - | - | - |
| H.E. | 1 | - | 1 | - | - | - |
| S&A | 4 | 3 | 1 | 2 | 1 | 1 |
| V.M. | - | - | - | - | - | - |
| B.C.* | - | - | - | 2 | 1 | 1 |
| Tot. | 10 | 4 | 6 | 9 | 7 | 2 |

* Basic College.

Cases which received Treatment - 188 Students.

Of the group of 232 freshmen with low scores on the Arithmetic Proficiency Test, forty-four students (19 per cent) withdrew from school before completing the required course in arithmetic. Twenty-three of the students were males and twenty-one were females. Of the forty-four students, nineteen were single or arithmetic-only deficiency cases and twenty-five were multiple-deficiency cases. Theoretically, if these students had finished their freshmen year, they would have completed the course in arithmetic.

The remaining 188 freshmen actually did complete the course in arithmetic. The status of these students at the end of the four-year period has been presented in Table 89. The percentages are, of course, somewhat more favorable for the Treated Group than for the Low Group as a whole. For the treated cases, approximately one out of five had received the bachelor's degree. Of an additional 26 cases still in school, 20 held senior status. Thus, it appeared that approximately one out of every three freshmen in the treated group would receive the bachelor's degree.

TABLE 89
STATUS OF 188 TREATED CASES
SUMMER 1955

| | No. | % | M | % | F | % |
|------|------------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 41 | 21.8 | 13 | 17.1 | 28 | 25.0 |
| Sch. | 26 | 13.8 | 17 | 22.4 | 9 | 8.0 |
| Out | <u>121</u> | <u>64.4</u> | <u>46</u> | <u>60.5</u> | <u>75</u> | <u>67.0</u> |
| Tot. | 188 | 100.0 | 76 | 100.0 | 112 | 100.0 |

In Table 90, a breakdown according to grade-point average has been presented for the 121 students who dropped out of school. In approximately two out of every three cases, these students had less than a "C" average. The percentage of males with less than a "C" average was significantly higher than for females. Of the 121 students, 38 students, or 31.4 per cent reached an Upper School before dropping out.

TABLE 90
GRADE-POINT STATUS OF 121 DROP-OUT CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|------------|----------|----------|----------|------------|
| 0 to 1 | 5 | 4.1 | 4 | 8.7 | 1 | 1.3 |
| 1 to 2 | 75 | 62.0 | 38 | 82.6 | 37 | 49.4 |
| 2 to 3 | 37 | 30.6 | 4 | 8.7 | 33 | 44.0 |
| 3 to 4 | <u>4</u> | <u>3.3</u> | <u>-</u> | <u>-</u> | <u>4</u> | <u>5.3</u> |
| Tot. | 121 | 100.0 | 46 | 100.0 | 75 | 100.0 |

Table 91 has been used to present the grade-point average of the 67 students who had either received their degrees or were still in school at the end of the four-year period.

TABLE 91
GRADE-POINT STATUS OF 67 DEGREE OR SCHOOL CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|------------|----------|------------|----------|------------|
| 1 to 2 | 6 | 8.9 | 4 | 13.3 | 2 | 5.4 |
| 2 to 3 | 58 | 86.6 | 25 | 83.4 | 33 | 89.2 |
| 3 to 4 | <u>3</u> | <u>4.5</u> | <u>1</u> | <u>3.3</u> | <u>2</u> | <u>5.4</u> |
| Tot. | 67 | 100.0 | 30 | 100.0 | 37 | 100.0 |

Single-Deficiency Treated Cases. There were 117 treated cases with single deficiencies (arithmetic-only). The status of these students has been presented in Table 92. Approximately one out of every four of these students had received the bachelor's degree at the end of the four-year period. Of an additional 18 cases still in school, 14 held senior status. Thus, it appeared that approximately two out of every five freshmen with a single deficiency would receive the bachelor's degree.

TABLE 92
STATUS OF 117 SINGLE-DEFICIENCY CASES
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 31 | 26.5 | 9 | 25.0 | 22 | 27.2 |
| Sch. | 18 | 15.4 | 11 | 30.6 | 7 | 8.6 |
| Out | <u>68</u> | <u>58.1</u> | <u>16</u> | <u>44.4</u> | <u>52</u> | <u>64.2</u> |
| Tot. | 117 | 100.0 | 36 | 100.0 | 81 | 100.0 |

In Table 93, a breakdown according to grade-point average has been presented for the 68 students who dropped out of school. In approximately one-half of the cases, these students had less than a "C" average. The percentage of males with less than a "C" average was significantly higher than for females. Of the 68 students, 26 students, or 38.2 per cent, reached an Upper School before dropping out.

TABLE 93
GRADE-POINT STATUS OF 68 DROP-OUT CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|----------|------------|----------|----------|----------|------------|
| 0 to 1 | 1 | 1.5 | - | - | 1 | 1.9 |
| 1 to 2 | 32 | 47.0 | 13 | 81.3 | 19 | 36.5 |
| 2 to 3 | 31 | 45.6 | 3 | 18.7 | 28 | 53.9 |
| 3 to 4 | <u>4</u> | <u>5.9</u> | <u>-</u> | <u>-</u> | <u>4</u> | <u>7.7</u> |
| Tot. | 68 | 100.0 | 16 | 100.0 | 52 | 100.0 |

The data on the grade-point average for the 49 students who had either received their degrees or were still in school at the end of the four-year period was the same as that presented in Table 80.

Multiple-Deficiency Treated Cases. There were 71 cases with multiple deficiencies who received treatment in the form of an arithmetic course. The status of these students has been presented in Table 94. The percentage of multiple-deficiency cases who received degrees was significantly lower (5 per cent level) than the percentage for single-deficiency cases. Approximately one out of seven of the multiple-deficiency cases had received the bachelor's degree at the end of the four-year period. Of an additional eight cases still in school, six held senior status. Thus, it appeared that approximately one out of every four freshmen with a multiple deficiency would receive the bachelor's degree.

TABLE 94
STATUS OF 71 MULTIPLE-DEFICIENCY CASES
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 10 | 14.1 | 4 | 10.0 | 6 | 19.4 |
| Sch. | 8 | 11.3 | 6 | 15.0 | 2 | 6.4 |
| Out | <u>53</u> | <u>74.6</u> | <u>30</u> | <u>75.0</u> | <u>23</u> | <u>74.2</u> |
| Tot. | 71 | 100.0 | 40 | 100.0 | 31 | 100.0 |

In Table 95, a breakdown according to grade-point average has been presented for the 53 students who dropped out of school. In approximately nine out of ten cases, these students had less than a "C" average. With the removal of the untreated cases, the percentage of males with less than a "C" average was significantly higher (5 per cent level) than the percentage of females. Of the 53 students, 12 students, or 22.6 per cent, reached an Upper School before dropping out.

TABLE 95
GRADE-POINT STATUS OF 53 DROP-OUT CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|-----|-------|----|-------|----|-------|
| 0 to 1 | 4 | 7.6 | 4 | 13.3 | - | - |
| 1 to 2 | 43 | 81.1 | 25 | 83.4 | 18 | 78.3 |
| 2 to 3 | 6 | 11.3 | 1 | 3.3 | 5 | 21.7 |
| 3 to 4 | - | - | - | - | - | - |
| Tot. | 53 | 100.0 | 30 | 100.0 | 23 | 100.0 |

Table 96 has been used to present the grade-point average for the 18 students who had either received their degrees or were still in school at the end of the four-year period.

TABLE 96
GRADE-POINT STATUS OF 18 DEGREE OR SCHOOL CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|-----|-------|----|-------|---|-------|
| 1 to 2 | 2 | 11.1 | 1 | 10.0 | 1 | 12.5 |
| 2 to 3 | 16 | 88.9 | 9 | 90.0 | 7 | 87.5 |
| 3 to 4 | - | - | - | - | - | - |
| Tot. | 18 | 100.0 | 10 | 100.0 | 8 | 100.0 |

Treated Cases - Grouped according to Instructor.

The 188 cases who received treatment in the form of an arithmetic course were also grouped according to the instructor of the arithmetic course. Table 97 has been used to present their status at the end of the four-year period. There was no significant difference between the percentage of students who received degrees for the respective instructors. Likewise, no significant difference between the percentage of males who received degrees was found, nor between the females. For the instructors individually, there was no significant difference between the percentage of males who received degrees and the percentage of females.

TABLE 97
STATUS OF 188 TREATED CASES
GROUPED BY INSTRUCTORS
SUMMER 1955

| | Instructor X | | | Instructor Y | | |
|------|--------------|-------------|-------------|--------------|-------------|-------------|
| | % Tot. | % M | % F | % Tot. | % M | % F |
| Deg. | 19.4 | 11.5 | 24.4 | 27.8 | 29.2 | 26.7 |
| Sch. | 13.4 | 23.1 | 7.3 | 14.8 | 20.8 | 10.0 |
| Out | <u>67.2</u> | <u>65.4</u> | <u>68.3</u> | <u>57.4</u> | <u>50.0</u> | <u>63.3</u> |
| Tot. | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

In Table 98, a breakdown according to grade-point average has been presented for the students who dropped out of school. The percentage of males who received less than a "C" average was significantly higher than the percentage of females for each instructor. However, no significant differences were found in comparing percentages between the respective instructors. Of the students who dropped out of school, 36.7 per cent under Instructor X and 16.1 per cent under Instructor Y reached an Upper School before dropping out. This difference was significant at the 5 per cent level.

TABLE 98
GRADE-POINT STATUS OF 121 DROP-OUT CASES
GROUPED BY INSTRUCTORS
SUMMER 1955

| Ave. | Instructor X | | | Instructor Y | | |
|--------|--------------|--------|------------|--------------|--------|------------|
| | % Tot. | % M | % F | % Tot. | % M | % F |
| 0 to 1 | 5.6 | 11.8 | 1.8 | - | - | - |
| 1 to 2 | 62.2 | 79.4 | 51.8 | 61.3 | 91.7 | 42.1 |
| 2 to 3 | 28.9 | 8.8 | 41.1 | 35.5 | 8.3 | 52.6 |
| 3 to 4 | <u>3.3</u> | - | <u>5.3</u> | <u>3.2</u> | - | <u>5.3</u> |
| Tot. | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Table 99 has been used to present the grade-point average for the students who had either received their degrees or were still in school at the end of the four-year period.

TABLE 99
GRADE-POINT STATUS OF 67 DEGREE OR SCHOOL CASES
GROUPED BY INSTRUCTORS
SUMMER 1955

| Ave. | Instructor X | | | Instructor Y | | |
|--------|--------------|--------|------------|--------------|------------|------------|
| | % Tot. | % M | % F | % Tot. | % M | % F |
| 1 to 2 | 11.3 | 16.7 | 7.7 | 4.3 | 8.3 | - |
| 2 to 3 | 86.4 | 83.3 | 88.5 | 87.0 | 83.4 | 90.9 |
| 3 to 4 | <u>2.3</u> | - | <u>3.8</u> | <u>8.7</u> | <u>8.3</u> | <u>9.1</u> |
| Tot. | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Study of 82 Cases

Borderline Group. The Borderline Group was made up of an additional 82 cases. These students had scored immediately above the students in the Low Group on the Arithmetic Proficiency Test in the fall of 1951, and hence were designated as a Borderline Group. Their scores were, of course, lower than those obtained by the students in the Middle Group. These students were not required to enroll in the arithmetic course; that is, they did not receive treatment.

Of the 82 students, 16 students, or 19.5 per cent, were transfer students. The status of these sixteen transfer students has been presented in Table 100. Nine of these students had received bachelor's degrees by the summer of 1955. The percentage involved was not significantly different from the percentages already noted for the High Group, the Middle Group, and the Low Group. Within the Borderline Group, there was no significant difference between the percentage of males and females who received degrees.

TABLE 100
STATUS OF 16 TRANSFER STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|----------|-------------|----------|-------------|----------|-------------|
| Deg. | 9 | 56.2 | 3 | 50.0 | 6 | 60.0 |
| Sch. | 1 | 6.3 | 1 | 16.7 | - | - |
| Out | <u>6</u> | <u>37.5</u> | <u>2</u> | <u>33.3</u> | <u>4</u> | <u>40.0</u> |
| Tot. | 16 | 100.0 | 6 | 100.0 | 10 | 100.0 |

Table 101 has been used to present, in a similar manner, the status of the 66 freshmen at the end of the four-year period. The percentage of freshmen who received degrees in the Borderline Group was significantly lower (5 per cent level) than the percentage from the Middle Group. However, the difference in the percentages between the Borderline Group and the Low Group was not significant. Approximately one out of every four freshmen had received the bachelor's degree by the end of the four-year period. Of the twelve students still in school, nine held senior status. Thus, it appeared that approximately two out of every five freshmen would receive the bachelor's degree.

TABLE 101
STATUS OF 66 FRESHMEN STUDENTS
SUMMER 1955

| | No. | % | M | % | F | % |
|------|-----------|-------------|-----------|-------------|-----------|-------------|
| Deg. | 16 | 24.2 | 6 | 23.1 | 10 | 25.0 |
| Sch. | 12 | 18.2 | 7 | 26.9 | 5 | 12.5 |
| Out | <u>38</u> | <u>57.6</u> | <u>13</u> | <u>50.0</u> | <u>25</u> | <u>62.5</u> |
| Tot. | 66 | 100.0 | 26 | 100.0 | 40 | 100.0 |

In Table 102, a breakdown according to grade-point average has been presented for the 38 freshmen who dropped out of school. In approximately five out of every eight cases, these students had less than a "C" average. The percentage of males with less than a "C" average was significantly higher (5 per cent level) than for females. Of the 38 students, five students, or 13.2 per cent reached an Upper School before dropping out. This was a significantly lower percentage (5 per cent level) than that shown for the group which received treatment in the form of an arithmetic course.

TABLE 102
GRADE-POINT STATUS OF 38 DROP-OUT CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|-----|-------|----|-------|----|-------|
| 0 to 1 | 5 | 13.2 | 3 | 23.1 | 2 | 8.0 |
| 1 to 2 | 19 | 50.0 | 8 | 61.5 | 11 | 44.0 |
| 2 to 3 | 14 | 36.8 | 2 | 15.4 | 12 | 48.0 |
| 3 to 4 | - | - | - | - | - | - |
| Tot. | 38 | 100.0 | 13 | 100.0 | 25 | 100.0 |

Table 103 has been used to present the grade-point average for the 28 students who had either received their degrees or who were still in school at the end of the four-year period.

TABLE 103
GRADE-POINT STATUS OF 28 DEGREE OR SCHOOL CASES
SUMMER 1955

| Ave. | No. | % | M | % | F | % |
|--------|-----|-------|----|-------|----|-------|
| 1 to 2 | 2 | 7.1 | 2 | 15.4 | - | - |
| 2 to 3 | 23 | 82.2 | 11 | 84.6 | 12 | 80.0 |
| 3 to 4 | 3 | 10.7 | - | - | 3 | 20.0 |
| Tot. | 28 | 100.0 | 13 | 100.0 | 15 | 100.0 |

In Table 104, data have been presented on those students who graduated with honors out of the original 66 freshmen in the Borderline Group. One out of every 22 freshmen in the group graduated "With Honor". The percentage involved was not significantly lower than that shown for the Middle Group, nor was it significantly higher than that shown for the Low Group. None of the 26 males in the Borderline Group graduated "With Honor" as compared to three of the forty females. The percentage difference, however, was not significant. No students from the Borderline Group graduated "With High Honor".

TABLE 104
DISTRIBUTION OF 3 HONOR STUDENTS
BORDERLINE GROUP
SUMMER 1955

| | No. | % | M | % | F | % |
|-----------|-----|-----|----|---|----|-----|
| Sample | 66 | | 26 | | 40 | |
| Honor | 3 | 4.5 | - | - | 3 | 7.5 |
| High Hon. | - | - | - | - | - | - |
| H + HH | 3 | 4.5 | - | - | 3 | 7.5 |

In Table 105, a distribution according to Upper Schools has been made for the 16 students who received degrees and also for the 12 students still in school. No students from the Borderline Group received degrees in Engineering, Home Economics, or Veterinary Medicine. However, there were two Home Economics students still in school at the end of the four-year period.

TABLE 105
DISTRIBUTION OF 28 STUDENTS BY SCHOOLS

| Sch. | No. | Degrees | | No. | In School | |
|-------|-----|---------|----|-----|-----------|---|
| | | M | F | | M | F |
| Ag. | 2 | 2 | - | - | - | - |
| BPS | 4 | 3 | 1 | 4 | 4 | - |
| Ed. | 4 | - | 4 | 3 | 1 | 2 |
| Eng. | - | - | - | - | - | - |
| H.E. | - | - | - | 2 | - | 2 |
| S&A | 6 | 1 | 5 | 2 | 1 | 1 |
| V.M. | - | - | - | - | - | - |
| B.C.* | - | - | - | 1 | 1 | - |
| Tot. | 16 | 6 | 10 | 12 | 7 | 5 |

* Basic College.

In Table 106, a distribution according to Upper Schools has been made for the three honor students (females) included in the sixteen degrees. Approximately one out of every five degrees granted in the Borderline Group was with honors.

TABLE 106
DISTRIBUTION OF 16 DEGREES
AND 3 HONOR STUDENTS
BY SCHOOLS

| Sch. | Deg. | Honor | % |
|------|----------|----------|----------|
| Ag. | 2 | - | - |
| BPS | 4 | - | - |
| Ed. | 4 | 2 | 50.0 |
| Eng. | - | - | - |
| H.E. | - | - | - |
| S&A | 6 | 1 | 16.7 |
| V.M. | <u>-</u> | <u>-</u> | <u>-</u> |
| Tot. | 16 | 3 | 18.7 |

Summary³I. Study of 810 Cases.

The 810 cases consisted of the students with the 270 highest scores on the Arithmetic Proficiency Test in the fall of 1951, the 270 middle scores, and the 270 lowest scores. The achievement of these students at the end of a four-year period was determined.

A. Transfer Students.

1. For the Total Group of 810 cases, 198 students, or 24 per cent, were transfer students. Of the 198 transfer students, 71 per cent had received the bachelor's degree by the end of the four-year period. No significant difference was observed between the percentage of males and females who received degrees.

2. For the High Group of 270 cases, 93 students, or 34 per cent, were transfer students. Of the 93 transfer students, 74 per cent had received their degrees by the end of the four-year period. The percentage of males who received degrees was significantly higher (5 per cent level) than the percentage of females.

³ The data on achievement have also been summarized in Tables II-V in the Appendix.

3. For the Middle Group of 270 cases, 67 students, or 25 per cent, were transfer students. Of the 67 transfer students, 75 per cent had received their degrees by the end of the four-year period. This percentage was not significantly different from the percentage shown for the High Group. No significant difference was observed between the percentage of males and females who received degrees in the Middle Group.

4. For the Low Group of 270 cases, 38 students, or 14 per cent, were transfer students. Three of the 38 students were multiple-deficiency cases. Of the 38 transfer students, 58 per cent had received their degrees by the end of the four-year period. Although this was a noticeably lower percentage, it was not significantly different from the percentages shown for the Middle Group and the High Group. No significant difference was observed between the percentage of males and females who received degrees in the Low Group.

B. Freshmen Students.

1. For the Total Group of 810 cases, 612 students were freshmen. Some 35 per cent had received the bachelor's degree by the end of the four-year period. An additional 14 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of

degrees for the 612 students was 49 per cent. The percentage of freshmen who received degrees was significantly lower than the percentage of transfer students.

Of the 612 students, 13 per cent graduate with honors (8 per cent "With Honor", and 5 per cent "With High Honor"). In other words, 13 per cent of the students graduated with a "B" average or above. No significant difference was observed between the percentage of males and females who received degrees or who graduated with honors.

Of the 315 students who dropped out of school, 63 per cent had less than a "C" average. The percentage was significantly higher for males than for females. Of the 315 students, 31 per cent reached an Upper School before dropping out.

Some of the 315 students who dropped out of Michigan State University may, of course, have transferred to other colleges, and may have completed the requirements for the bachelor's degree at such colleges.

Out of 215 degrees received in this group, 37 per cent were with honors. Of the degrees issued to males, 33 per cent were with honors as compared to 41 per cent for females. For the entire 2,516 degrees issued during the 1954-1955 school year, 15 per cent were with honors.

Of the degrees issued to males, 12 per cent were with honors as compared to 22 per cent for females. The percentage difference favoring the females was a significant one for the larger group.

Degrees were divided rather evenly between Bachelor of Arts and Bachelor of Science for the males. However, for the females, approximately two out of every three degrees were Bachelor of Arts.

In terms of the number of degrees issued, the School of Science and Arts ranked first. It was followed by Business and Public Service, Education, Engineering, Agriculture, Home Economics, and Veterinary Medicine. This order prevailed for the 215 degrees in the sample as well as for the entire 2,516 degrees issued during the school year 1954-1955.

2. For the High Group of 270 cases, 177 students were freshmen. Some 54 per cent had received the bachelor's degree by the end of the four-year period. An additional 17 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees for the 177 students was 71 per cent. No significant difference was observed between the percentage of males and females who received degrees.

Of the 177 students, 35 per cent graduated with honors (20 per cent "With Honor", and 15 per cent "With High Honor"). The percentage of males who graduated with honors from this group was significantly lower than the percentage of females.

Of the 51 students who dropped out of school, 27 per cent had less than a "C" average. No significant difference was observed between the percentage for males and for females. Of the 51 students, 61 per cent reached an Upper School before dropping out.

Out of 95 degrees received in the High Group, 65 per cent were with honors. Of the degrees issued to males, 53 per cent were with honors as compared to 86 per cent for females. The percentage difference favoring the females was significant.

Of the 177 freshmen in the High Group, 61 per cent were high in arithmetic only. The remaining 39 per cent were multiple-sufficiency cases - arithmetic and reading; arithmetic and writing; or arithmetic, reading, and writing.

The percentage of males with multiple sufficiencies was significantly lower than the percentage of females. In fact, there were only three males among the nineteen students who were high in all three areas.

Approximately one-half of the students who were high in more than one area graduated with honors as compared to one-fourth of the students who were high in arithmetic only. This represented a significant difference. Of the 69 students who were high in more than one area, 30 per cent graduated "With High Honor" as compared to 6 per cent of the 108 students who were high in arithmetic only.

3. For the Middle Group of 270 cases, 203 students were freshmen. Some 39 per cent had received their degrees by the end of the four-year period. An additional 12 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees for the 203 students was 51 per cent. A significantly lower percentage of the Middle Group had received degrees than for the High Group.

Of the 203 students, 7 per cent graduated with honors (5 per cent "With Honor", and 2 per cent "With High Honor"). This was a significantly lower percentage than for the High Group. No significant difference was observed between the percentage of males and females who received degrees or who graduated with honors in the Middle Group.

Of the 100 students who dropped out of school, 70 per cent had less than a "C" average. This was a significantly higher percentage than for the High Group. The percentage of males in the Middle Group with less than a "C" average was significantly higher than for females. Of the 100 students, 26 per cent reached an Upper School before dropping out. This was a significantly lower percentage than for the High Group.

Out of 79 degrees received in the Middle Group, 18 per cent were with honors. Of the degrees issued to males, 14 per cent were with honors as compared to 23 per cent for females. The percentage difference, favoring the females, was not a significant one.

4. For the Low Group of 270 cases, 232 students were freshmen. Some 18 per cent had received their degrees by the end of the four-year period. An additional 11 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees for the 232 students was 29 per cent. A significantly lower percentage of the Low Group had received degrees than for the Middle Group.

There were no degrees in Engineering or Veterinary Medicine for the Low Group.

Of the 232 students, three students (1.3 per cent) graduated "With Honor". This was a significantly lower percentage than for the Middle Group. No students from the Low Group graduated "With High Honor". No significant difference was observed between the percentage of males and females who received degrees or who graduated with honors.

Of the 164 students who dropped out of school, 70 per cent had less than a "C" average. The percentage was significantly higher for males than for females. Of the 164 students, 25 per cent reached an Upper School before dropping out.

Out of 41 degrees received in the Low Group, 7 per cent were with honors. The percentage was the same for males and females.

Of the 232 freshmen in the Low Group, 59 per cent were low in arithmetic only. The remaining 41 per cent were multiple-deficiency cases - arithmetic and reading; arithmetic and writing; or arithmetic, reading, and writing. The percentage of males with multiple deficiencies was significantly higher than the percentage of females.

4.1 The Single-Deficiency Group contained 136 freshmen. Some 23 per cent had received their degrees by the end of the four-year period. An additional 13 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees for the 136 students was 36 per cent.

Of the 136 students, three graduated "With Honor". No significant difference was observed between the percentage of males and females who received degrees or who graduated "With Honor".

There were no degrees in Agriculture, Engineering, or Veterinary Medicine for the Single-Deficiency Group.

Of the 87 students who dropped out of school, 54 per cent had less than a "C" average. The percentage was significantly higher for males than for females. Of the 87 students, 31 per cent reached an Upper School before dropping out.

4.2 The Multiple-Deficiency Group contained 96 freshmen. Some 10 per cent had received their degrees by the end of the four-year period. An additional 10 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees for the 96 students was 20 per cent. A significantly lower percentage (5 per cent level) of the Multiple-Deficiency Group had received

degrees than for the Single-Deficiency Group. No significant difference was observed between the percentage of males and females who received degrees.

None of the 96 students with a multiple deficiency graduated "With Honor".

There were no degrees in Business and Public Service, Engineering, or Veterinary Medicine for the Multiple-Deficiency Group.

Of the 77 students who dropped out of school, 88 per cent had less than a "C" average. This percentage was significantly higher than for the Single-Deficiency Group. No significant difference was observed between the percentage of males and females with less than a "C" average in the Multiple-Deficiency Group. Of the 77 students, 18 per cent reached an Upper School before dropping out.

4.3 The group which received treatment in the form of an arithmetic course contained 188 cases. Some 22 per cent had received their degrees by the end of the four-year period. An additional 14 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees for the 188 students was 36 per cent. The percentage of degrees for this treated group was significantly lower than the percentage for the Middle Group. No significant difference was observed between the percentage of males and females who received degrees in the treated group.

Of the 121 students who dropped out of school, 66 per cent had less than a "C" average. The percentage was significantly higher for males than for females. Of the 121 students, 31 per cent reached an Upper School before dropping out.

4.31 Of the students who received treatment, 117 were single-deficiency cases. Some 27 per cent had received their degrees by the end of the four-year period. An additional 15 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees for the 117 cases was 42 per cent. No significant difference was observed between the percentage of males and females who received degrees.

Of the 68 students who dropped out of school, 49 per cent had less than a "C" average. The percentage was significantly higher for males than for females. Of the 68 students, 38 per cent reached an Upper School before dropping out.

4.32 Of the students who received treatment, 71 were multiple-deficiency cases. Some 14 per cent had received their degrees by the end of the four-year period. An additional 11 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees for the 71 cases was 25 per cent. A significantly lower percentage (5 per cent level) of these treated cases

with multiple deficiencies had received degrees than for the treated cases with a single deficiency. No significant difference was found between the percentage of males and females who received degrees for the treated cases with multiple deficiencies.

Of the 53 students who dropped out of school, 89 per cent had less than a "C" average. This percentage was significantly higher than for the treated cases with a single deficiency. The percentage of males with less than a "C" average was significantly higher (5 per cent level) than for females. Of the 53 students, 23 per cent reached and Upper School before dropping out.

4.33 For the cases who received treatment in the form of an arithmetic course from Instructor X, some 19 per cent had received their degrees by the end of the four-year period. An additional 14 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees was 33 per cent. No significant difference was found between the percentage of males and females who received degrees.

Of the students who dropped out of school, under Instructor X, 68 per cent had less than a "C" average. The percentage was significantly higher for males than for females. Of the students who dropped out of school, 37 per cent reached an Upper School before dropping out.

4.34 For the cases who received treatment in the form of an arithmetic course from Instructor Y, some 28 per cent had received their degrees by the end of the four-year period. An additional 15 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees was 43 per cent. No significant difference was found between the percentage of males and females who received degrees.

As between instructors, there was no significant difference between the percentage of students who received degrees. Likewise, there was no significant difference between the percentage of males who received degrees, nor between the percentage of females.

Of the students who dropped out of school, under Instructor Y, 61 per cent had less than a "C" average. The percentage was significantly higher for males than for females. Of the students who dropped out of school, 16 per cent reached an Upper School before dropping out.

II. Study of 82 Cases.

The 82 cases consisted of an additional 82 students. These students had scored immediately above the students in the Low Group on the Arithmetic Proficiency Test in the fall of 1951, and hence were designated as the Borderline Group. Their scores were, of course, below

those obtained by the students in the Middle Group. These borderline cases were not required to enroll in the arithmetic course; that is, they did not receive treatment. The achievement of these students at the end of a four-year period was determined.

A. Transfer Students.

For the Borderline Group of 82 cases, sixteen students, or 20 per cent, were transfer students. Of the sixteen students, nine students (56 per cent) had received the bachelor's degree by the end of the four-year period. This percentage was not significantly different from the percentages already noted for the High Group, the Middle Group, and the Low Group. Within the Borderline Group, there was no significant difference between the percentage of males and females who received degrees.

B. Freshmen Students.

There were 66 freshmen in the Borderline Group. Some 24 per cent had received the bachelor's degree by the end of the four-year period. An additional 18 per cent were still in school and appeared likely to graduate. Thus, the expected percentage of degrees was 42 per cent.

While the percentage of students who received degrees in the Borderline Group was not significantly different from the percentage found for the Low Group, it was significantly lower (5 per cent level) than the percentage for the Middle Group.

Within the Borderline Group, no significant difference was found between the percentage of males and females who received degrees.

There were no degrees in Engineering, Home Economics, or Veterinary Medicine for the Borderline Group.

Of the 66 students, three students (4.5 per cent) graduated "With Honor". This was not a significantly lower percentage than that shown for the students in the Middle Group, nor was it a significantly higher percentage than that shown for the students in the Low Group.

None of the 26 males graduated "With Honor" as compared to three of the 40 females. The percentage difference, however, was not significant. No student from the Borderline Group graduated "With High Honor".

Of the 38 students who dropped out of school, 63 per cent had less than a "C" average. The percentage was significantly higher (5 per cent level) for males than for females. Of the 38 students, 13 per cent reached an Upper School before dropping out. This was a significantly lower percentage (5 per cent level) than that shown for the group which received treatment in the form of an arithmetic course.

Out of 16 degrees received in the Borderline Group, 19 per cent were with honors. A percentage difference favoring the females was not significant.

Footnotes

1 Michigan State College Catalog 1951-1952,
A Bulletin of Michigan State College, Vol. 45, No. 18,
May, 1951, pp. 74-76, 83.

2 "Ninety-Seventh Annual Commencement,"
Michigan State College, June 5, 1955.

3 Ibid.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary

A summary of the analysis of clinical cases and parent population follows:

1. Approximately one out of every eight new students received a low score on the Arithmetic Proficiency Test.

2. The percentage of males with low scores on the Arithmetic Proficiency Test was significantly lower than the percentage of females.

3. The percentage of freshmen with low scores on the Arithmetic Proficiency Test was significantly higher than the percentage of transfer students.

4. There was no difference in the percentage of students with low scores on the Arithmetic Proficiency Test for students from Michigan high schools and for students from non-Michigan high schools.

5. There was no difference in the percentage of students with low scores on the Arithmetic Proficiency Test for students from large schools and for students from small schools, that is, according to Classes: A, B, C, D.

6. For Class A, Class B, and Class D schools as a group, the percentage of students with low scores on the Arithmetic Proficiency Test was significantly lower (5 per cent level) for students from College-Agreement schools than for students from non-College Agreement schools.

For Class C schools, the percentage of students with low scores on the test was higher for students from College-Agreement schools than for students from non-College Agreement schools.

7. The percentage of students with low scores on the Arithmetic Proficiency Test was significantly lower for freshmen with an Engineering preference than for any other preference group.

8. The percentage of students with low scores on the Arithmetic Proficiency Test was significantly higher for freshmen with an Education preference than for any other preference group.

9. The percentage of students with low scores on the Arithmetic Proficiency Test was significantly lower for Preference students as a group than for No Preference students as a group. However, when Engineering students were removed from the Preference group, no significant difference occurred.

10. Of the students with high scores (above 90 per cent) on the Arithmetic Proficiency Test, seven out of every eight ranked in the upper half of the distribution of the new-student population on the quantitative section of the American Council on Education Psychological Examination.

11. Of the students with low scores (below 60 per cent) on the Arithmetic Proficiency Test, seven out of every eight ranked in the lower half of the distribution of the new-student population on the quantitative section of the psychological test.

12. Of a High Group, a Middle Group, and a Low Group, as determined by the Arithmetic Proficiency Test, the High Group had a significantly higher mean derived score on the quantitative section of the psychological test than the Middle Group. In turn, the Middle Group had a significantly higher mean derived-score than the Low Group.

13. When the students from the High Group, the Middle Group, and the Low Group, as determined by the Arithmetic Proficiency Test, were combined, the mean derived-score for the males on the quantitative section of the psychological test was significantly higher than the mean derived score for females.

Three out of every five males scored in the upper half of the distribution of the new-student population on the quantitative section as compared to three out of every eight females. The difference was significant.

14. On the basis of tests administered to new students, one out of every four new students was deficient in one or more of the three skills tested, namely: reading, writing, and arithmetic.

15. Multiple deficiencies, involving reading, writing, and/or arithmetic, occurred at the rate of seven out of every one hundred new students. The percentage of males with multiple deficiencies was significantly higher than the percentage of females.

16. Males predominated in the writing-deficiency category (five to one). Females predominated in the arithmetic-deficiency category (three to two). In the reading-deficiency category, the male-female ratio approximated the three-to-two ratio for the new-student parent population.

17. One out of every two reading-deficiency cases showed a multiple deficiency; three out of every five writing-deficiency cases showed a multiple deficiency; and one out of every three arithmetic-deficiency cases showed a multiple deficiency.

A summary¹ of the findings regarding the attrition of clinical cases and non-clinical cases follows:

1. For the Total Group and also for the Middle Group, approximately three out of every four freshmen returned for the sophomore year. Approximately five out of every nine students returned for the junior year. Approximately one out of every two students returned for the senior year.

2. For the Total Group, the percentage of males who returned for the sophomore year was not significantly different from the percentage of females. However, a significantly higher percentage (5 per cent level) of males returned for the junior year as well as for the senior year.

3. As a group, the rate of return for students with high scores on the Arithmetic Proficiency Test was significantly higher (15 to 20 per cent higher) than the rate for students with middle scores.

4. As a group, the rate of return for students with low scores on the Arithmetic Proficiency Test was significantly lower (15 to 20 per cent lower) than the rate of return for students with middle scores.

¹ The data on attrition have also been summarized in Table I in the Appendix.

5. When students with low scores on the Arithmetic Proficiency Test were separated into single-deficiency cases and multiple-deficiency cases, the rate of return was not significantly different for the sophomore year. However, for the junior year and also for the senior year, the rate of return for multiple-deficiency cases was significantly lower (20 per cent lower) than the rate for single-deficiency cases.

6. For the sophomore year, the rate of return for students who received treatment in the form of an arithmetic course was not significantly different from the rate of return for students in the Middle Group. However, for the junior year and also for the senior year, the rate of return for the treated group was significantly lower than the rate of return for the Middle Group.

7. For the sophomore year and also for the junior year, the rate of return for students who received treatment in the form of an arithmetic course was higher than the rate of return for students in the Borderline Group who did not receive treatment. However, for the senior year, the rate of return for the treated group was lower than the rate of return for the Borderline Group. The differences, however, were not significant.

8. There were no significant differences in the rate of return of the students of the respective instructors of the arithmetic course.

9. While the rate of return for students in the Borderline Group was lower than the rate of return for students in the Middle Group for the sophomore year, the junior year, and the senior year, it was significantly lower only for the junior year.

A summary² of the findings regarding the achievement of clinical cases and non-clinical cases follows:

1. For the Total Group and also for the Middle Group, approximately two out of every six students received the bachelor's degree by the end of the normal four-year college period, while one additional student out of every six was still in school and appeared likely to graduate.

Thus, approximately one out of every two freshmen who entered Michigan State University may be expected to graduate from Michigan State University. There was no significant difference in the percentage of males and females who received degrees.

² The data on achievement have also been summarized in Tables II - V in the Appendix.

2. For the Total Group, approximately one out of every eight freshmen graduated with honors (with a "B" average or above) as compared to one out of every fourteen freshmen for the Middle Group. This represented a significant difference favoring the Total Group.

The percentage of males who graduated with honors was lower than the percentage for females for the Total Group and also for the Middle Group. The differences, however, were not significant.

3. Of the students who dropped out of school, approximately five out of every eight from the Total Group had less than a "C" average, as compared to seven out of every ten from the Middle Group. The difference was not significant.

The percentage of males with less than a "C" average was significantly higher than the percentage of females for the Total Group and also for the Middle Group.

Of the students who dropped out, three out of every ten from the Total Group reached an Upper School before dropping out, as compared to one out of every four from the Middle Group. The difference was not significant.

4. A significantly higher percentage of students with high scores on the Arithmetic Proficiency Test received the bachelor's degree than did students in the Middle Group. Approximately seven out of every ten students with high scores either graduated or were near graduation at the end of the four-year period.

5. Approximately one out of every three students with high scores on the Arithmetic Proficiency Test graduated with honors. This represented a significantly higher percentage than that shown for the students in the Middle Group. The percentage of males who graduated with honors in the High Group was significantly lower than the percentage of females.

6. Of the students who were high in more than one area (reading and/or writing, in addition to arithmetic), one out of every two graduated with honors. Of the students who were high in arithmetic only, one out of every four graduated with honors. This represented a significant difference, favoring the students with multiple sufficiencies.

7. Within the High Group, the percentage of males with multiple sufficiencies was significantly lower than the percentage of females. That is, on the basis of tests administered to new students, females tended to be high in more than one area more frequently than did males.

8. Approximately one out of every four drop-out cases from the High Group had less than a "C" average. This represented a significantly lower percentage than was true for the students in the Middle Group.

Of the students who dropped out of school from the High Group, three out of every five reached an Upper School before dropping out. This represented a significantly higher percentage than was true for the students in the Middle Group.

9. A significantly lower percentage of students with low scores on the Arithmetic Proficiency Test received the bachelor's degree than did students in the Middle Group. Approximately three out of every ten students with low scores either graduated or were near graduation at the end of the four-year period.

10. Approximately one out of every one hundred students with low scores on the Arithmetic Proficiency Test graduated with honors. This represented a significantly lower percentage than that shown for students in the Middle Group.

11. No students in the Low Group on the Arithmetic Proficiency Test graduated in Engineering or Veterinary Medicine.

12. When students with low scores on the Arithmetic Proficiency Test were separated into single-deficiency cases and multiple-deficiency cases, a significantly lower percentage (5 per cent level) of students with a multiple deficiency received the bachelor's degree than did students with a single deficiency. Approximately one out of every five students with a multiple deficiency either graduated or was near graduation as compared to one out of every three students with a single deficiency.

13. No student with a multiple deficiency graduated with honors.

14. The percentage of drop-out cases with less than a "C" average was significantly higher for multiple-deficiency cases than for single-deficiency cases. For the multiple-deficiency group, the rate was seven out of every eight students who dropped out as compared to five out of every nine students for the single-deficiency group.

15. Within the Low Group, the percentage of males with multiple deficiencies was significantly higher than the percentage of females. That is, on the basis of tests administered to new students, males tended to be low in more than one area more frequently than did females.

16. For students who received treatment in the form of an arithmetic course, a significantly lower percentage received the bachelor's degree than did students in the Middle Group.

17. The percentage of students who received degrees was not significantly different for students who received treatment in the form of an arithmetic course and for students in the Borderline Group who did not receive treatment.

18. The percentage of students who received degrees was not significantly different for the students of the respective instructors of the arithmetic course.

19. For students with borderline-low scores on the Arithmetic Proficiency Test, a significantly lower percentage (5 per cent level) received the bachelor's degree than did students in the Middle Group. Approximately two out of every five students with borderline scores either graduated or were near graduation at the end of the four-year period.

20. Approximately one out of every twenty students with borderline-low scores on the Arithmetic Proficiency Test graduated with honors. This was not a significantly lower percentage than that shown for the students in the Middle Group, nor was it a significantly higher percentage than that shown for the students in the Low Group.

21. No students from the Borderline Group on the Arithmetic Proficiency Test graduated in Engineering or Veterinary Medicine.

22. Of the students who dropped out of school, approximately one out of every eight from the Borderline Group reached an Upper School before dropping out, as compared to one out of every three from the group which received treatment in the form of an arithmetic course. This represented a significant difference (5 per cent level) favoring the group which received treatment.

23. For the Total Group, approximately seven out of every ten transfer students received the bachelor's degree, as compared to three out of every four transfer students for the Middle Group. The difference was not significant.

There was no significant difference in the percentage of males and females who received degrees.

24. The percentage of transfer students who received the bachelor's degree was significantly higher than the percentage of freshmen.

25. For transfer students with high scores on the Arithmetic Proficiency Test as compared to transfer students with middle scores on the test, there was no noticeable difference in the percentage of students who received the bachelor's degree.

26. For transfer students with low scores on the Arithmetic Proficiency Test, approximately three out of every five received the bachelor's degree. While this represented a lower percentage than that shown for the Middle Group, the difference was not significant.

Conclusions

The following conclusions regarding low levels of performance on the Arithmetic Proficiency Test occurring in patterns within the new-student population at Michigan State University appear warranted:

1. Low levels of performance on the test appear to be significantly associated with the sex of the students. That is, females tend to receive low scores more frequently than males.

2. Low levels of performance on the test appear to be significantly associated with the status (freshman or transfer) of the students. That is, freshmen tend to receive low scores on the test more frequently than transfer students.

3. Low levels of performance on the test do not appear to be significantly associated with the geographical origin of the students. That is, there appears to be no difference in the tendency for students from Michigan high schools to receive low scores on the test, and in the tendency for students from non-Michigan high schools to receive low scores on the test.

4. Low levels of performance on the test do not appear to be significantly associated with the class of the high school attended. That is, there appears to be no difference in the tendency for students from large schools to receive low scores on the test, and in the tendency for students from small schools to receive low scores on the test.

5. Low levels of performance on the test may be significantly associated with the College-Agreement status of the high school attended. That is, for Class A, Class B, and Class D schools as a group, students from College Agreement schools tend to receive low scores less frequently than students from non-College Agreement schools.

However, students from Class C College-Agreement schools tend to receive low scores more frequently than students from Class C non-College Agreement schools.

6. Low levels of performance on the test appear to be significantly associated with the major preference of students in two of the eight preference groups, namely: Engineering and Education. Engineering students tend to receive low scores on the test less frequently than any other preference group. Education students tend to receive low scores more frequently than any other preference group.

7. Low levels of performance on the arithmetic test appear to be associated with relatively low scores on the quantitative section of the psychological test. Students with low scores on the arithmetic test tend to rank in the lower half of the distribution of the new-student population on the quantitative section of the psychological test.

Females tend to receive low scores on the quantitative section of the psychological test more frequently than males. The difference is significant and similar to the difference found for the arithmetic test.

8. There appears to be some association among low levels of performance in the three skills tested, namely: reading, writing, and arithmetic. That is, one out of every two students deficient in reading tends to show a multiple deficiency. Three out of every five students deficient in writing tend to show a multiple deficiency. One out of every three students deficient in arithmetic tends to show a multiple deficiency.

Males tend to have multiple deficiencies more frequently than females. The difference is significant.

The following conclusions regarding the level of performance on the Arithmetic Proficiency Test and the attrition of students at Michigan State University appear warranted:

1. Of the students who enter Michigan State University as freshmen, approximately:

a. Three out of every four appear likely to return for the sophomore year;

b. Five out of every nine appear likely to return for the junior year; and

c. One out of every two appears likely to return for the senior year.

These ratios prevail when students with high scores, middle scores, and low scores on the test are considered as a group. The ratios also prevail when students with middle scores are considered separately.

2. A high level of performance on the test appears to be associated with a relatively high rate of return by students for the sophomore, junior, and senior years. That is, students with high scores on the test show a significantly higher rate of return than students with middle scores.

3. A low level of performance on the test appears to be associated with a relatively low rate of return by students for the sophomore, junior, and senior years. That is, students with low scores on the test show a significantly lower rate of return than students with middle scores. Students with multiple deficiencies show an even lower rate of return.

4. Treatment in the form of an arithmetic course may tend to raise the rate of return of students with low scores on the test. That is, for the sophomore year, there appears to be no significant difference between the rate of return for students who receive treatment and for students in the Middle Group.

5. The instructor of the course in arithmetic does not appear to be a significant factor in the rate of return of the students who receive such treatment. That is, for the sophomore, junior, and senior years, there appear to be no significant differences in the rate of return of the students of the respective instructors.

The following conclusions regarding the level of performance on the Arithmetic Proficiency Test and the achievement of students at Michigan State University appear warranted:

1. Of the students who enter Michigan State University as freshmen, approximately:

a. One out of every two appears likely to graduate from Michigan State University;

b. One out of every eight appears likely to graduate with honors;

c. Five out of every eight of the drop-out cases appear likely to have less than a "C" average; and

d. Three out of every ten of the drop-out cases appear likely to reach an Upper School before dropping out.

These ratios prevail when students with high scores, middle scores, and low scores on the test are considered as a group.

The sex factor appears to be significant in drop-out cases. That is, the percentage of male drop-out cases with less than a "C" average tends to be higher than the percentage of female drop-out cases.

2. A high level of performance by students on the test tends to indicate the following with respect to achievement, namely:

- a. A relatively high percentage of such students is likely to graduate;
- b. A relatively high percentage of such students is likely to graduate with honors;
- c. A relatively low percentage of drop-out cases is likely to have less than a "C" average; and
- d. A relatively high percentage of drop-out cases is likely to reach an Upper School before dropping out.

Thus, students with high scores on the test appear to have an advantage with respect to achievement at Michigan State University. The advantage appears even more pronounced for students with multiple sufficiencies. Such students appear to have a fifty-fifty chance of graduating with honors.

The sex factor appears to be significant in multiple-sufficiency cases. That is females tend to be high in more than one area more frequently than males.

3. A low level of performance by students on the test tends to indicate the following with respect to achievement, namely:

- a. A relatively low percentage of such students is likely to graduate;
- b. A relatively low percentage of such students is likely to graduate with honors;
- c. A relatively high percentage of drop-out cases is likely to have less than a "C" average; and
- d. A relatively low percentage of drop-out cases is likely to reach an Upper School before dropping out.

Thus, students with low scores on the test appear to be handicapped with respect to achievement at Michigan State University. The handicap appears even more pronounced for students with multiple deficiencies. Such students do not appear likely to graduate with honors.

The sex factor appears to be significant in multiple-deficiency cases. That is, males tend to be low in more than one area more frequently than females.

Implications

Administration.

1. The problem of deficiencies in the area of arithmetic appears to be a continuing one. Over a four-year period, approximately one out of every eight new students has scored below 60 per cent on the Arithmetic Proficiency Test.

2. The study raises the question of whether a proportionate number of students from non-College Agreement schools enter college. At least they did not enter Michigan State University in the fall of 1953.

Of some seven hundred classified high schools (A, B, C, D, E) in Michigan, 32 per cent were members of the College Agreement. Of the freshmen who entered Michigan State University after attending Michigan high schools, 58 per cent came from College-Agreement schools.

Expressed otherwise, 86 per cent of the College-Agreement high schools sent freshmen to Michigan State University as compared to 55 per cent of the non-College Agreement high schools.

3. The study suggests that additional consideration of the preparation of potential college students may be indicated. Of some three thousand new students who were tested, one out of every four was found to be deficient in one or more of the three skills tested, namely: reading, writing, and arithmetic.

4. The findings of the study with respect to attrition and achievement may prove helpful to the counselor in interpreting test scores and in working with individual students. Multiple deficiencies and multiple sufficiencies appear to take on added significance in light of the present study.

Further Study.

1. In the present study, the percentage of females with low scores on the Arithmetic Proficiency Test was significantly higher than the percentage of males. A future study might be concerned with various hypotheses concerning this matter.

2. In analyzing the new-student population with respect to low scores on the Arithmetic Proficiency Test, a classification of the students according to age was not included. In any future study, this factor might well be investigated.

3. Further investigation of the performance of students from Class C, College-Agreement schools on the Arithmetic Proficiency Test might be undertaken. Such investigation might reveal whether the variation in performance of these students from that of the students from the College-Agreement schools for the other classes (A, B, D) may be attributed to chance or whether some other explanation is forthcoming.

4. Additional investigation might be conducted regarding the influence of the sex factor in multiple deficiencies and multiple sufficiencies. On the basis of the tests administered to new students, males tended to be low in more than one area more frequently than females; and females tended to be high in more than one area more frequently than males. The differences were significant.

5. The study revealed that approximately one-half of the students who entered Michigan State University as freshmen had dropped out of school by the beginning of the senior year. A follow-up of these students would be helpful in determining the number who entered other colleges and the number who may be expected to graduate from such colleges.

6. Further study might reveal why the percentage of males who returned for the junior year and also for the senior year was significantly higher than the percentage of females.

7. Of the drop-out cases, the percentage of males who had less than a "C" average was significantly higher than the percentage of females. An explanation of this condition might result from further investigation.

8. A Borderline Group and a Middle Group might be given treatment in the form of the non-credit course in arithmetic in an effort to determine the possible effect of the course on such groups. The present study has provided data for such groups which did not receive treatment. Thus, certain comparisons would be possible.

9. A High Group, Middle Group, and Low Group on the basis of the reading test and on the basis of the writing test might also be studied. Such studies could determine whether the level of performance on these tests might also serve as an indication of the probable attrition and/or achievement of new students at Michigan State University. If confirmed, the usefulness of the test results would, of course, be enhanced.

LIST OF REFERENCES

- Dahnke, H. L., "Comparative Standings of the Various School and Curriculum Groups on the Orientation Week Examinations for the Fall of 1954," Michigan State College (Board of Examiners), Fall 1954, 28 pp.
- "Directory of Students," Michigan State College, (Office of the Registrar), 1951-52; 1952-53; 1953-54; 1954-55.
- "Distribution of Student Enrollments - New Students," Michigan State College (Office of the Registrar), Fall Term: 1951; 1952; 1953; 1954.
- General Education in School and College, (A Committee Report by Members of the Faculties of Andover, Exeter, Lawrenceville, Harvard, Princeton, and Yale), Cambridge: Harvard University Press, 1952, p. 22.
- Larsen, H. D., Arithmetic for Colleges, New York: The Macmillan Co., 1950, p. v, Preface.
- Leonhardy, A. V., "The Mathematics Used in the Humanities, Social Science, and Natural Science Areas in a Program of General Education on the College Level" (Ed. D. thesis, University of Missouri, 1950). Seen in abstract only - The University of Missouri Bulletin, Vol. 53, No. 5, February 10, 1952 (Education Series, No. 46, Study 45) pp. 84-85.
- Lindquist, E. F., Statistical Analysis in Educational Research, Cambridge: The Riverside Press, 1940, 266 pp.
- McNemar, Quinn, Psychological Statistics, New York: John Wiley & Sons Inc., 1949, pp. 75-77.
- "Michigan High School Directory," Michigan High School Athletic Association Bulletin, Vol. 30, No. 4-S, November, 1953, (Lansing: Department of Public Instruction).
- "Michigan Secondary School-College Agreement," Michigan College Association, November 7, 1946.
- Michigan State College Catalog 1951-1952, A Bulletin of Michigan State College, Vol. 45, No. 18, May, 1951, pp. 74-76, 83.

Michigan State College Catalog 1952-1953, A Bulletin of Michigan State College, Vol. 47, No. 12, September, 1952, pp. 57-58.

Minutes of the All-College Committee on Arithmetic,
Michigan State College, 1950-1951.

Minutes of the Michigan State College Faculty, June, 1951.

"New Students Fall Term 1953 - Alphabetical List by
Michigan High Schools and Colleges," Michigan State
College (Office of the Registrar), Fall 1953.

"Ninety-Seventh Annual Commencement," Michigan State
College, June 5, 1955.

"Schools approved for Admission under the Michigan
Secondary School-College Agreement," Lansing:
Department of Public Instruction, 1953.

Smith, G. M., A Simplified Guide to Statistics for
Psychology and Education, New York: Rinehart & Co.,
Inc., 1951, 109 pp.

Stephenson, E. C., "Mathematics in a Retail Business,"
The Mathematics Teacher, Vol. 46, No. 1, January,
1953, pp. 18-22.

"Test Scores by Students entering Fall Term 1951,"
Michigan State College (Board of Examiners), Fall 1951.

Van Engen, H., "Arithmetic in the Junior-Senior High
School," The Teaching of Arithmetic, (Fiftieth Year-
book, Part II, National Society for the Study of
Education), Chicago: University of Chicago Press,
1951, pp. 103-119.

Warrington, W. G., "Some Data from the First Year of the
Follow-Through Study of the Students entering Michigan
State College in Fall 1953," Michigan State College
(Board of Examiners), Fall 1954, 27 pp.

APPENDICES

APPENDIX A

SUMMARY OF DATA ON ATTRITION AND ACHIEVEMENT

Code for Tables I, II, III, IV, and V

(The tables present data in summary form of a follow-up study of certain students selected from some twenty-four hundred freshmen who entered Michigan State University in the fall of 1951)

- T-Gp - Total Group (H-Gp + M-Gp + L-Gp)
- M-S - Multiple-Sufficiency Cases (at the time they entered MSU, these students were high on the reading test and/or the writing test, in addition to the arithmetic test)
- S-S - Single-Sufficiency Cases (students who were high on only the Arithmetic Proficiency Test)
- H-Gp - High Group (students with scores above 90 per cent on Arithmetic Proficiency Test)
(M-S + S-S)
- M-Gp - Middle Group (students with scores about the median score of 76 per cent on the Arithmetic Proficiency Test)
- L-Gp - Low Group (students with scores below 60 per cent on Arithmetic Proficiency Test)
(S-D + M-D)
- S-D - Single-Deficiency Cases (students who were low on only the Arithmetic Proficiency Test)
- M-D - Multiple-Deficiency Cases (at the time they entered MSU, these students were low on the reading test and/or the writing test, in addition to the arithmetic test)
- L (Tr) - Low-Group students who received treatment in the form of a non-credit course in arithmetic.
 $SD(Tr) + MD(Tr) = L(Tr)$
- SD(Tr) - Single-Deficiency Cases who received treatment.
- MD(Tr) - Multiple-Deficiency Cases who received treatment.
- Inst X Treated cases grouped according to instructor
 - of arithmetic course.
- Inst Y Inst X cases + Inst Y cases = L (Tr)
- B-L Gp - Borderline Group (students with scores immediately above those of students in Low Group)
B-L cases not included in T-Gp.

TABLE I

CHAPTER III - ATTRITION

RETURN TO SCHOOL OF STUDENTS WHO
ENTERED MSU AS FRESHMEN, F 1951

* sig. 1% level
** sig. 5% level

| Gp | No. | F 1952 | | F 1953 | | F 1954 | |
|--------|-----|----------------|-------|----------------|----------------------|----------------|----------------------|
| | | % | M%-F% | % | M%-F% | % | M%-F% |
| T-Gp | 612 | <u>74</u> | 75-72 | <u>57</u> | 61-52 | <u>47</u> | 52-42 |
| M-S | 69 | <u>94</u> | 94-94 | <u>84</u> | 94-74 | <u>68</u> | 76-60 |
| S-S | 108 | <u>87</u> | 88-83 | <u>77</u> | 79-71 | <u>70</u> | 73-63 |
| H-Gp | 177 | <u>90</u> * | 90-90 | <u>80</u> * | 83-73 | <u>69</u> * | 74-61 |
| M-Gp | 203 | <u>75</u> * | 74-78 | <u>60</u> * | 60-61 | <u>49</u> * | 50-48 |
| L-Gp | 232 | <u>59</u> | 58-61 | <u>37</u> | 37-38 | <u>29</u> | 28-29 |
| S-D | 136 | <u>64</u> | 61-65 | <u>46</u> * | 50-43 | <u>38</u> * | 46-35 |
| M-D | 96 | <u>53</u> | 55-51 | <u>26</u> | 27-24 | <u>16</u> | 15-17 |
| L (Tr) | 188 | <u>71</u> | 70-71 | <u>45</u> | * with M-Gp 46-44 | <u>36</u> | * with M-Gp 37-35 |
| SD(Tr) | 117 | <u>73</u> | 72-73 | <u>52</u> * | 61-48 | <u>44</u> * | 56-40 |
| MD(Tr) | 71 | <u>68</u> | 68-68 | <u>32</u> | 33-32 | <u>21</u> | 20-21 |
| Inst X | 134 | <u>75</u> | 71-77 | <u>44</u> | 42-45 | <u>34</u> | 35-33 |
| Inst Y | 54 | <u>61</u> | 67-57 | <u>46</u> | 54-40 | <u>41</u> | 42-40 |
| B-L Gp | 66 | <u>65</u> | 62-68 | <u>41</u> | * with M-Gp 50-35 | <u>41</u> | 46-38 |

TABLE II

+Rec'd deg. or still in Sch. DEGREE REPORT SUMMER 1955 ON STUDENTS WHO ENTERED MSU AS FRESHMEN, F 1951

CHAPTER IV - ACHIEVEMENT

* sig. 1% level
** sig. 5% level

| Gp | No. | Deg. | % | +Exp. % | Deg. M%-F% |
|--------|-----|------|----|--------------------|---------------|
| T-Gp | 612 | 215 | 35 | 49 | 34-36 |
| M-S | 69 | 41 | 59 | 72 | 56-63 |
| S-S | 108 | 54 | 50 | 70 | 48-58 |
| H-Gp | 177 | 95 | 54 | 71 | 50-61 |
| | | | * | | |
| M-Gp | 203 | 79 | 39 | 51 | 36-44 |
| | | | * | | |
| L-Gp | 232 | 41 | 18 | 29 | 13-21 |
| S-D | 136 | 31 | 23 | 36 | 21-24 |
| | | | ** | | |
| M-D | 96 | 10 | 10 | 20 | 7-15 |
| L (Tr) | 188 | 41 | 22 | * with M-Gp 36 | 17-25 |
| SD(Tr) | 117 | 31 | 27 | 42 | 25-27 |
| | | | ** | | |
| MD(Tr) | 71 | 10 | 14 | 25 | 10-19 |
| Inst X | 134 | 26 | 19 | 33 | 12-24 |
| Inst Y | 54 | 15 | 28 | 43 | 29-27 |
| B-L Gp | 66 | 16 | 24 | ** with M-Gp 42 | 23-25 |

Note: The %'s in the "Exp. %" column may vary slightly from the %'s in the "F 1954" column of Table I. Table I is based on Fall 1954 whereas Table II is based on Summer 1955. Some students may have been in school in the fall but not in the following summer, and vice versa.

TABLE III

CHAPTER IV - ACHIEVEMENT
 REPORT ON STUDENTS GRADUATING
 WITH "B" AVERAGE OR ABOVE
 OUT OF GROUP OF FRESHMEN
 WHO ENTERED MSU F 1951

* sig. 1% level
 ** sig. 5% level

H = Honor
 HH = High Honor

| Gp. | No. | Honors | % | M%-F% | H%-HH% |
|--------|-----|--------|---------|------------------|--------|
| T-Gp | 612 | 79 | 13 | 11-15 | 8-5 |
| M-S | 69 | 34 | 49 * | 41-57 | 19-30 |
| S-S | 108 | 28 | 26 | 20-46 ** * | 20-6 |
| H-Gp | 177 | 62 | 35 * | 26-53 | 20-15 |
| M-Gp | 203 | 14 | 7 * | 5-10 | 5-2 |
| L-Gp | 232 | 3 | 1.3 | 1.0-1.5 | 1.3-0 |
| S-D | 136 | 3 | 2.2 | 2.3-2.2 | 2.2-0 |
| M-D | 96 | - | - | - | - |
| B-L Gp | 66 | 3 | 4.5 | 0-7.5 | 4.5-0 |

Note: No student with a Multiple Deficiency graduated with honors.

No student from the Low Group or the Borderline Group graduated "With High Honor".

TABLE IV

CHAPTER IV - ACHIEVEMENT

DATA ON DROP-OUTS FOR GROUP OF STUDENTS
WHO ENTERED MSU AS FRESHMEN, F 1951

* sig. 1% level
** sig. 5% level

U.S.=Upper Sch.

| Gp. | No. | Drops | Below "C" | % | M%-F% | Reached U.S. | % |
|--------|-----|-------|--------------|-------------------|-------------------------|-----------------|---|
| T-Gp | 612 | 315 | 199 | 63.2 | [*] 75.0-50.9 | 98 | 31.1 |
| M-S | 69 | 19 | 3 | 15.8 | 25.0- 9.1 | 14 | 73.7 |
| S-S | 108 | 32 | 11 | 34.4 | 39.1-22.2 | 17 | 53.1 |
| H-Gp | 177 | 51 | 14 | 27.4 | 35.5-15.0 | 31 | 60.8 |
| M-Gp | 203 | 100 | 70 | 70.0 | [*] 80.3-53.8 | 26 | 26.0 |
| L-Gp | 232 | 164 | 115 | 70.1 | [*] 88.2-57.3 | 41 | 25.0 |
| S-D | 136 | 87 | 47 | 54.0 | [*] 83.4-42.9 | 27 | 31.0 |
| M-D | 96 | 77 | 68 | 88.3 | 90.9-84.9 | 14 | 18.2 |
| L (Tr) | 188 | 121 | 80 | [*] 66.1 | [*] 91.3-50.7 | 38 | ^{**} 31.4 [*] with H. |
| SD(Tr) | 117 | 68 | 33 | 48.5 | [*] 81.3-38.4 | 26 | 38.2 |
| MD(Tr) | 71 | 53 | 47 | 88.7 | ^{**} 96.7-78.3 | 12 | 22.6 |
| Inst X | 134 | 90 | 61 | 67.8 | [*] 91.2-53.6 | 33 | 36.7 |
| Inst Y | 54 | 31 | 19 | 61.3 | [*] 91.7-42.1 | 5 | 16.1 |
| B-L Gp | 66 | 38 | 24 | [*] 63.2 | ^{**} 84.6-52.0 | 5 | ^{**} 13.2 [*] with L(Tr); [*] with H. |

TABLE V

CHAPTER IV - ACHIEVEMENT

REPORT ON DEGREES ISSUED
FOR SCHOOL YEAR 1954-55

* sig. 1% level

** sig. 5% level

H = Honor

HH = High Honor

| Gp. | Deg. | Honors | % | M%-F% | (H%-HH%) |
|----------|------|--------|------|-----------|-------------|
| Gd. Tot. | 2516 | 386 | 15.3 | 11.9-22.4 | (11.0- 4.3) |
| T-Gp | 215 | 79 | 36.7 | 32.8-41.4 | (22.8-13.9) |
| M-S | 41 | 34 | 82.9 | 73.7-90.9 | |
| | | | * | | |
| S-S | 54 | 28 | 51.9 | 42.5-78.6 | |
| | | | | * | |
| H-Gp | 95 | 62 | 65.3 | 52.5-86.1 | |
| | | | * | | |
| M-Gp | 79 | 14 | 17.7 | 13.6-22.9 | |
| L-Gp | 41 | 3 | 7.3 | 7.7- 7.1 | |
| S-D | 31 | 3 | 9.7 | 11.1- 9.1 | |
| M-D | 10 | - | - | - | |
| B-L Gp | 16 | 3 | 18.7 | 0 -30.0 | |

APPENDIX B

ARITHMETIC PROFICIENCY TEST

ARITHMETIC PROFICIENCY TEST

Michigan State College

TO THE STUDENT

The faculty at Michigan State College has found that all students need to understand certain fundamentals of arithmetic. For students whose scores on this test are lower than a determined level, an Arithmetic Improvement Service has been established. Should your score be lower than this level, you will receive special instruction in arithmetic. No college credit is allowed for this work, but successful completion of the program prescribed by the Arithmetic Improvement Service is necessary before enrollment in courses making use of arithmetic skills.

DIRECTIONS

1. For each question select the one best answer.
2. Mark this answer on the answer sheet with the special pencil which has been provided you.
3. Do not put any marks on this test booklet. Do any figuring or scribbling on the back of your answer sheet.
4. On the answer sheet print your name, the date, and the name of the test in the appropriate places. On the line numbered 1____, print your student number.

1. When several numbers are added together, the answer is called
 A the sum. B the product.
 C the quotient. D a term.
 E the difference.
2. $692 + 5007 + 13 =$
 A 13227 B 5702 C 5612 D 5713
 E none of these.
3. Which of the following is NOT reduced to lowest terms?
 A $\frac{2}{3}$ B $\frac{10}{13}$ C $\frac{4}{5}$ D $\frac{3}{10}$ E $\frac{5}{10}$
4. Which of the following is 4 less than 10?
 A 14 B $\frac{10}{4}$ C 6 D 40
 E None of these.
5. If Mr. Jones pays \$20 for a lawnmower and Mr. Smith pays twice as much as Mr. Jones, then Mr. Smith pays
 A \$40 B \$22 C \$18 D \$10
 E none of these.
6. If $3x = 27$, then $x =$
 A 9 B 24 C 30 D 81
 E none of these.
7. Find the sum of 26.31, .07, and 203.23.
 A .022961 B 536.33 C 229.61
 D 229.51 E None of these.
8. Which is largest $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$?
 A $\frac{1}{2}$ B $\frac{1}{3}$ C $\frac{1}{4}$ D All are equal.
 E It is impossible to tell.
9. $\frac{17}{3}$ may be also be written as
 A $5\frac{2}{3}$ B $6\frac{1}{3}$ C $1\frac{7}{3}$ D 5.2
 E none of these.
10. If $x + 3 = 10$, then $x =$
 A $3\frac{1}{3}$ B 7 C 13 D 30
 E none of these.
11. $\frac{30,000}{100} =$
 A 3,000 B 300 C 30 D .333
 E none of these.
12. $.6200 - .0135 =$
 A .6065 B .6165 C .6075
 D .6175 E none of these.
13. Seven less than a thousand is
 A 1007 B 1993 C 93 D 1093
 E none of these.
14. Subtract $\frac{1}{5}$ from $\frac{2}{3}$.
 A $\frac{8}{15}$ B $\frac{7}{15}$ C $\frac{1}{2}$ D $\frac{13}{15}$
 E None of these.
15. Change $\frac{5}{8}$ to 48ths.
 A $\frac{30}{48}$ B $\frac{40}{48}$ C $\frac{15}{24}$ D $\frac{5}{8}$
 E None of these.
16. Multiply 219 by 807.
 A 176,733 B 1026 C 176,633
 D 19,053 E None of these.
17. $500 \times .073 =$
 A 35.5 B 36.5 C 365 D 36,500
 E none of these
18. $10,000 \times .015 =$
 A 15.0000 B 150 C 1500
 D 150,000 E none of these.
19. What is 6% of 22?
 A 1.32 B 13.2 C 132 D 3.67
 E None of these.
20. If $x^2 = 16$, then $x =$
 A 4 B 8 C 32 D 256
 E none of these.
21. Examine the division problem given below. What is the answer correct to the nearest tenth?

$$\begin{array}{r}
 49 \overline{) 307.00} \\
 \underline{294} \\
 130 \\
 \underline{98} \\
 320 \\
 \underline{294} \\
 26
 \end{array}$$

A 6.2
 B 6.3
 C 6.26
 D 6.27
 E None of these.
22. Express .35 as a percent.
 A $\frac{35}{100}$ B 35% C 3.5% D .35%
 E None of these.
23. $.0858 \div 1.43 =$
 A .585 B 16.7 C .6 D .06
 E none of these.
24. $\frac{3}{5} \times \frac{4}{15} =$
 A $\frac{4}{25}$ B 1 C 3 D $\frac{9}{4}$
 E none of these.
25. One may write "x is to y as r is to t" as
 A $xy = rt$ B $\frac{x}{y} = \frac{t}{r}$ C $\frac{x}{y} = \frac{r}{t}$
 D $x + y = r + t$ E none of these.

26. Express 5% as a common fraction.

- A $\frac{1}{5}$ B $\frac{5}{10}$ C $\frac{1}{25}$ D $\frac{1}{20}$
E None of these.

27. Express $\frac{41}{4}$ as a decimal.

- A. 4.0 B .10 C 1.25 D 10.25
E None of these.

28. By inspection, we can say 61.03 is 49.9% of a number approximately equal to

- A 30 B 90 C 300 D 1.20
E 120

29. $3.7 \div 100 =$

- A 103.7 B .37 C .037 D .0037
E none of these.

30. One hundred lbs. of milk contain 4 lbs. of butterfat. In order to find how many lbs. of butterfat are in 75 lbs. of the same milk, one could solve the proportion

- A $\frac{100}{4} = \frac{x}{75}$ B $\frac{100}{75} = \frac{x}{4}$ C $\frac{4}{x} = \frac{75}{100}$
D $100 \times 4 = 75x$ E $\frac{4}{100} = \frac{x}{75}$

31. If $\frac{2}{3} = \frac{a}{15}$, then it follows that

- A $15a = 6$ B $3a = 17$ C $2a = 45$
D $3a = 30$ E none of these.

32. By inspection, we can say $\frac{149}{300}$ of 17,999 is about

- A 90 B 900 C 9,000 D 3,600
E 36,000

33. $\frac{2}{7} \div \frac{8}{35} =$

- A $\frac{18}{35}$ B $\frac{4}{5}$ C $\frac{3}{28}$ D $1\frac{1}{4}$
E none of these.

34. Express the number 7375 rounded off to the nearest hundred.

- A 7375.00 B 738 C 74 D 7400
E None of these.

35. A team won 7 and lost 2 football games. What was the percent of games won?

- A 28.5% B 71% C 77.8% D 35%
E None of these.

36. Using the formula $I = PRT$, find T if P is 6,000, R is .04 and I is 720.

- A 1 B 2 C 3 D 30
E None of these.

37. Change 57.2% to its decimal equivalent.

- A 57.02 B .572 C .0572 D 57.2
E None of these.

38. Which is smallest .47, .471, or .407?

- A .47 B .471 C .407
D They are all the same size
E You cannot tell.

39. $\frac{3}{7} + \frac{3}{28} + \frac{1}{4} =$

- A $\frac{17}{28}$ B $\frac{5}{7}$ C $\frac{11}{14}$ D $\frac{19}{28}$

E none of these.

40. 10.2 is 17% of what number?

- A 1.734 B 60 C 6 D 1.67
E None of these.

41. Express $\frac{2}{7}$ as a percent correct to the nearest tenth of a percent.

- A 2.7% B 28.6% C .29% D 14%
E None of these.

42. An equation such as $\frac{x}{2} = \frac{7}{8}$ is often called

- A an identity. B a ratio.
C a quadratic. D a product.
E a proportion.

43. A rectangle is 10.3 ft. in length and 3.02 ft. in width. In order to find the area we multiply these numbers as shown. To make the answer imply a reasonable accuracy considering the given data, we say the area in square feet is

$$\begin{array}{r} 10.3 \\ \times 3.02 \\ \hline 206 \\ 309 \\ \hline 31.106 \end{array}$$

A 31.106 B 31.11 C 31.10
D 31.1 E 31

44. If two quantities x and y vary directly, then we know

- A $x + y$ is a constant.
B $x - y$ is a constant.
C xy is a constant.
D $\frac{x}{y}$ is a constant.
E none of these.

45. Assuming that the numbers in this addition problem are approximate and all numbers are given as accurately as they are known, then the answer which expresses the correct accuracy is

$$\begin{array}{r} 16.02 \\ + 2.307 \\ \hline 152.1 \\ + 170.427 \\ \hline 322.527 \end{array}$$

A 170.427 B 170.43
C 170.4 D 170
E none of these.

APPENDIX C

LIST OF CLASSIFIED HIGH SCHOOLS IN MICHIGAN IN 1953

Class A High Schools
(over 800 students)

| 37 College-Agreement H.S. sending Freshmen to MSU, Fall 1953 | | 1 College-Agreement H.S. not sending Freshmen |
|--|------------|---|
| Alpena | 6 | Detroit-Wright |
| Ann Arbor | 13 | |
| Battle Creek | 25 | |
| BayCity-Central | 9 | |
| BayCity-Handy | 5 | |
| Benton Harbor | 13 | |
| Berkeley | 9 | |
| Birmingham | 34 | |
| Dearborn | 27 | |
| Dearborn-Fordson | 11 | |
| Detroit-Denby | 20 | |
| Detroit-Northwestern | 2 | |
| Ferndale-Lincoln | 14 | |
| Flint-Central | 30 | |
| Flint-Northern | 10 | |
| Grosse Pte. | 27 | |
| Hamtramck | 3 | |
| Hazel Park | 3 | |
| Highland Park | 19 | |
| Kalamazoo-Central | 17 | |
| Lansing-Eastern | 89 | |
| Lansing-Sexton | 124 | |
| Lapeer | 14 | |
| Lincoln Park | 3 | |
| Midland | 23 | |
| Monroe | 16 | |
| Mt. Clemens | 6 | |
| Owosso | 18 | |
| Plymouth | 21 | |
| Pontiac | 22 | |
| Port Huron | 3 | |
| Royal Oak | 20 | |
| Saginaw-Arthur Hill | 26 | |
| Saginaw | 15 | |
| Traverse City-Central | 18 | |
| Wayne | 5 | |
| Ypsilanti | 4 | |
| | <u>724</u> | |
| | Freshmen | |

Class A High Schools

| 31 Non-C.A. H.S. sending Fr. to MSU, Fall 1953 | | 6 Non-C.A. H.S. not sending Fr. | |
|---|----------|------------------------------------|--|
| Detroit-Cass Tech | 10 | Detroit-Catholic Central | |
| Detroit-Central | 5 | Detroit-Cody | |
| Detroit-Chadsey | 4 | Detroit-Eastern | |
| Detroit-Cooley | 32 | Detroit-Northeastern | |
| Detroit-DeLaSalle | 2 | Detroit-St. Anthony | |
| Detroit-Mackenzie | 24 | Detroit-Southfield | |
| Detroit-Miller | 4 | | |
| Detroit-Mumford | 26 | | |
| Detroit-Northern | 2 | | |
| Detroit-Pershing | 10 | | |
| Detroit-Redford | 44 | | |
| Detroit-St. Joseph | 3 | | |
| Detroit-Southeastern | 10 | | |
| Detroit-Southwestern | 4 | | |
| Detroit-U. of D. High | 9 | | |
| Detroit-Western | 3 | | |
| East Detroit | 4 | | |
| Grand Haven | 9 | | |
| Grand Rapids-Cath. Cent | 17 | | |
| Grand Rapids-Central | 16 | | |
| Grand Rapids-Christian | 2 | | |
| Grand Rapids-Creston | 15 | | |
| Grand Rapids-Ottawa H. | 17 | | |
| Grand Rapids-South | 17 | | |
| Grand Rapids-Union | 16 | | |
| Holland | 10 | | |
| Jackson | 30 | | |
| Muskegon | 14 | | |
| Muskegon Heights | 2 | | |
| Waterford | 11 | | |
| Wyandotte-Roosevelt | <u>8</u> | | |

380 Freshmen

Class B High Schools
(325-799 Students)

80 C.A. H.S. sending
Fr. to MSU, Fall 1953

| | | | |
|-----------------------|----|-----------------------|----|
| Algonac | 4 | Leslie | 4 |
| Allegan | 9 | Ludington | 11 |
| Alma | 2 | Manistee | 5 |
| Auburn Heights | 2 | Marshall | 10 |
| Battle Creek-Lakeview | 18 | Milan | 2 |
| Belding | 9 | Mt. Pleasant | 3 |
| Belleville | 4 | Niles | 17 |
| Big Rapids | 1 | North Branch | 4 |
| Buchanan | 9 | North Muskegon | 1 |
| Cadillac | 7 | Otsego | 3 |
| Cass City | 6 | Petoskey | 9 |
| Charlotte | 15 | River Rouge | 2 |
| Cheboygan | 5 | Rochester | 7 |
| Coldwater | 4 | Rockford | 2 |
| Coopersville | 7 | Rogers City | 2 |
| Redford-Union | 7 | Romeo | 5 |
| Dowagiac | 11 | Romulus | 4 |
| Dundee | 2 | St. Clair S.-Lakeview | 2 |
| Durand | 9 | St. Clair S.-S. Lake | 6 |
| East Lansing | 51 | St. Johns | 11 |
| Eaton Rapids | 5 | St. Joseph | 7 |
| Flint-Bendle | 2 | Sandusky | 3 |
| Flint-Kearsley | 1 | South Haven | 6 |
| Flint-Technical | 4 | Three Rivers | 7 |
| Fremont | 3 | Van Dyke-Fitzgerald | 1 |
| Garden City | 2 | Van Dyke-Lincoln | 1 |
| Gladwin | 3 | Vassar | 2 |
| Grand Blanc | 6 | Vicksburg | 5 |
| Grand Ledge | 13 | Walled Lake | 9 |
| East Grand Rapids | 10 | Yale | 5 |
| Godwin Heights | 3 | Zeeland | 4 |
| Greenville | 10 | Escanaba | 9 |
| Hart | 4 | Iron Mountain | 4 |
| Hillsdale | 7 | Ironwood | 8 |
| Howell | 14 | Kingsford | 3 |
| Inkster | 2 | Marquette-Graveraet | 2 |
| Inkster-Roosevelt | 1 | Menominee | 5 |
| Ithaca | 2 | Munising | 1 |
| Kalamazoo-State High | 2 | Sault Ste. Marie | 1 |
| Lake Orion | 3 | Stephenson | 6 |

Class B High Schools

71 Non-C.A. H.S. sending
Fr. to MSU, Fall 1953

| | | | |
|--------------------------|----|-----------------------|----------|
| Adrian | 11 | Ionia | 9 |
| Albion | 5 | Lansing-Resurrection | 13 |
| Allen Park | 10 | Livonia-Bentley | 6 |
| Alpena-Catholic Central | 1 | Lowell | 4 |
| Bad Axe | 12 | Mason | 8 |
| Birmingham-Troy | 1 | Milford | 1 |
| Blissfield | 2 | Monroe-Cath. Central | 2 |
| Bloomfield Hills-Cranbr. | 1 | Mt. Clemens-St. Mary | 2 |
| Bronson | 3 | Mt. Morris | 6 |
| Caro | 4 | Muskegon-Cath. Cent. | 5 |
| Clawson | 3 | Northville | 8 |
| Clio | 1 | Oxford | 5 |
| Croswell | 3 | Pinconning | 4 |
| Davison | 7 | Plainwell | 1 |
| Dearborn-Lowrey | 1 | River Rouge-Lourdes | 1 |
| Detroit-St. Alphonsus | 2 | Roseville | 1 |
| Detroit-Lutheran | 2 | Royal Oak-Madison | 3 |
| Detroit-Redford St. Mary | 1 | Royal Oak-Shrine | 9 |
| Detroit-St. Ambrose | 1 | Saginaw-St. Andrew | 3 |
| Detroit-St. Andrew | 1 | St. Louis | 6 |
| Detroit-St. Catherine | 1 | Sparta | 3 |
| Detroit-St. Rita | 1 | Sturgis | 4 |
| Detroit-St. Stanislaus | 1 | Tecumseh | 6 |
| Detroit-St. Theresa | 6 | Temperance | 1 |
| Detroit-Servite | 1 | Trenton | 8 |
| Detroit-Visitation | 1 | Utica | 3 |
| East Tawas-Tawas | 8 | Warren | 1 |
| Ecorse | 2 | West Branch | 3 |
| Farmington | 11 | Wyandotte-St. Patrick | 1 |
| Flint-Beecher | 1 | | |
| Flushing | 2 | Gladstone | 2 |
| Gd. Rapids-Kelloggsville | 2 | Hancock | 2 |
| Gd. Rapids-Wyoming | 1 | Iron River | 3 |
| Hastings | 6 | Ishpeming | 4 |
| Holly | 2 | Manistique | 3 |
| | | Negaunee | 1 |
| | | Newberry | <u>1</u> |

Class B High Schools

6 C.A. H.S. not
sending Fr.

Carleton-Airport
Center Line-Busch
Chesaning
Marysville
Portage

St. Clair

22 Non-C.A. H.S.
not sending Fr.

Detroit-Austin Catholic
Detroit-Cathedral Center
Detroit-Harper Woods
Detroit-Nativity
Detroit-Redeemer

Detroit-St. Helwig
Detroit-Salesian
Ferndale-St. James
Flint-Mandeville
Flint-St. Michael

Grandville
Hamtramck-St. Florian
Hamtramck-St. Ladislaus
Holland-Christian
Hudsonville

Livonia-Clarenceville
Melvindale
Orchard Lake-St. Mary
Port Huron-St. Stephen
Taylor Center

Wyandotte-Mt. Carmel

Calumet

Class C High Schools

105 Non-C.A. H.S. sending
Fr. to MSU, Fall 1953

| | | | |
|-------------------------|---|------------------------|----|
| Addison | 2 | Harbor Beach | 2 |
| Almont | 3 | Hartford | 6 |
| Armada | 3 | Hartland | 4 |
| Bangor | 7 | Haslett | 6 |
| Barryton | 6 | Hesperia | 1 |
| Battle Creek-St. Philip | 1 | Howard City | 3 |
| Bay City-St. Joseph | 1 | Jackson-St. Mary | 1 |
| Beaverton | 1 | Jonesville | 4 |
| Berrien Springs | 4 | Kalamazoo-St. Aug. | 1 |
| Carson City | 3 | Laingsburg | 5 |
| Cassopolis | 5 | Lake City | 4 |
| Cedar Springs | 2 | Lake Odessa | 7 |
| Climax | 1 | Lakeview | 2 |
| Coleman | 3 | Lansing-St. Mary | 13 |
| Coloma | 1 | Litchfield | 1 |
| Colon | 1 | Manchester | 3 |
| Comstock Park | 2 | Marine City-Holy Cross | 1 |
| Constantine | 7 | Marion | 1 |
| Corunna | 3 | Mattawan | 1 |
| Dansville | 3 | Mayville | 4 |
| Deckerville | 1 | Merrill | 2 |
| Detroit-St. Cecilia | 1 | Millington | 1 |
| Detroit-St. Charles | 1 | Muskegon-Christian | 1 |
| Detroit-St. Thomas | 1 | Napoleon | 4 |
| Elkton | 2 | Nashville | 3 |
| Elsie | 5 | Newaygo | 1 |
| Farwell | 1 | New Troy | 3 |
| Fennville | 1 | North Adams | 2 |
| Fenton | 2 | Onaway | 7 |
| Flat Rock | 2 | Ortonville | 4 |
| Flint-Dye | 6 | Ovid | 7 |
| Flint-Sacred Heart | 2 | Pellston | 1 |
| Flint-St. Matthew | 3 | Perrinton | 3 |
| Flint-Utley | 1 | Petersburg | 3 |
| Glen Arbor-Leelanau | 6 | Pigeon | 2 |
| Goodrich | 3 | Pinckney | 2 |
| Gd. Rapids-Lee | 1 | Pittsford | 1 |
| Grayling | 2 | Pontiac-St. Frederick | 2 |
| Grosse Ile | 4 | Richland | 1 |
| Grosse Pte.-St. Paul | 3 | Roscommon | 4 |

Class C High Schools

105 Non-C.A. H.S. sending
Fr. to MSU, Fall 1953

| | |
|--------------------------|----------|
| Royal Oak-St. Mary | 1 |
| Saginaw-Lutheran | 1 |
| Saginaw-St. Mary | 3 |
| Saginaw-SS. Peter & Paul | 5 |
| Saline | 2 |
| Saranac | 3 |
| Scottville | 5 |
| Sebewaing | 1 |
| Springport | 2 |
| Standish | 1 |
| Stanton | 2 |
| Stockbridge | 1 |
| Union City | 6 |
| Watervliet | 6 |
| Wayland | 5 |
| White Cloud | 2 |
| Ypsilanti-Roosevelt | 3 |
| Bessemer | 3 |
| Houghton | 1 |
| Lake Linden | 1 |
| Norway | 4 |
| Rudyard | 3 |
| St. Ignace | 4 |
| S. Ste. Marie-Loretto | 1 |
| Stambaugh | <u>4</u> |

301 Freshmen

Class C High Schools

62 Non-C.A. H.S.
not sending Fr.

Ann Arbor-St. Thomas
Athens
Bay City-St. Stanislaus
Bay City-Visitation
Birch Run

Brown City
Camden
Center Line-St. Clement
Cheboygan-Catholic
Clinton-Boysville

Clinton
Dearborn-Sacred Heart
Decatur
Detroit-Annunciation
Detroit-Heart of Mary

Detroit-St. Bernard
Detroit-St. Casimir
Detroit-St. Cyril
Detroit-St. Francis
Detroit-St. Gabriel

Detroit-St. Gregory
Detroit-St. Leo
Detroit-St. Martin
Detroit-St. Philip
Detroit-St. Rose

Detroit-St. Vincent
Ecorse-St. Francis
Fairgrove
Flat Rock-Huron
Flint-Atherton

Flint-Bentley
Flint-St. Agnes
Flint-St. Mary
Fraser
Gaylord

Highland Park-St. Benedict
Hudsonville-Christian
Ida
East Jackson
Jackson-St. John

Jackson-Vandercook Lake
Kalamazoo-Christian
Lansing-Boys Voc. Sch.
Memphis
Michigan Center

Pontiac-St. Michael
Richmond-St. Augustine
Roseville-Eastland
St. Clair Shores-Lake Shore
St. Clair Shores-St. Gertrude

Sand Creek
Sheridan
Swartz Creek
Traverse City-St. Francis
Wayne-St. Mary

Wyandotte-Smith
Ypsilanti-Lincoln

Escanaba-St. Joseph
Ewen
L'Anse
Marquette-Baraga
Painesdale

Class D High Schools
(75-149 students)

| 14 C.A. H.S. sending Fr. to MSU, Fall 1953 | | 11 C.A. H.S. not sending Fr. | |
|---|----------|---------------------------------|--|
| Akron | 3 | Blanchard | |
| Atlanta | 3 | Dryden | |
| Baldwin | 2 | Mio | |
| Bath | 3 | Northport | |
| Central Lake | 3 | Saugautuck | |
| Concord | 4 | Tustin | |
| Dimondale | 5 | Vermontville | |
| Frankfort | 2 | | |
| Grass Lake | 1 | Felch | |
| Harrisville | 3 | Mass | |
| | | Pickford | |
| LeRoy | 3 | Powers | |
| Lyons | 2 | | |
| Dollar Bay | 1 | | |
| Rock | <u>1</u> | | |
| 36 Freshmen | | | |

Class D High Schools

64 Non-C.A. H.S. sending
Fr. to MSU, Fall 1953

| | | | |
|--------------------------|---|----------------------|----------|
| Adrian-Cath. Central | 2 | Morley | 1 |
| Ashley | 1 | Morrice | 2 |
| Benton Harbor-St. John | 1 | New Baltimore | 3 |
| Brethren | 2 | New Lothrop | 1 |
| Britton | 1 | Owendale | 1 |
| Brooklyn | 3 | Owosso-St. Paul | 2 |
| Carsonville | 1 | Parma | 1 |
| Centreville | 3 | Peck | 2 |
| Crystal | 2 | Pentwater | 2 |
| Custer | 1 | Pewamo | 1 |
| DeWitt | 3 | Port Austin | 4 |
| Eau Claire | 2 | Portland-St. Patrick | 1 |
| Elk Rapids | 2 | Pottersville | 1 |
| Ellsworth | 1 | Remus | 2 |
| Empire | 1 | Sunfield | 2 |
| Fairview | 1 | Suttons Bay | 3 |
| Fowler | 1 | Waldron | 1 |
| Galien | 1 | Webberville | 1 |
| Gaylord-St. Mary | 1 | Westphalia-St. Mary | 1 |
| Gobles | 1 | White Pigeon | 2 |
| Hale | 1 | Williamsburg | 1 |
| Hanover | 1 | Wolverine | 2 |
| Indian River | 1 | Woodland | 3 |
| Kaleva | 2 | Whittemore | 3 |
| Kent City | 1 | Eben Junction | 1 |
| Lansing-Mich. Sch. Blind | 1 | Gwinn | 2 |
| Lawrence | 2 | Hermansville | 1 |
| Lawton | 2 | Marquette-Pierce | 2 |
| Leland | 2 | Rapid River | <u>1</u> |
| Linden | 2 | | |
| Ludington-St. Simon | 1 | | |
| Marcellus | 1 | | |
| Marne | 1 | | |
| Mendon | 2 | | |
| Merrille-Sacred Heart | 1 | | |

102 Freshmen

Class D High Schools

114 Non-C.A. H.S.
not sending Fr.

Alanson
Alba
Arcadia
Au Gres
Baroda

Bay City-St. Mary
Bay Port
Beal City
Bear Lake
Bellaire

Bloomington
Boyne Falls
Bridgman
Buckley
Burr Oak

Carson City-St. Mary
Cedar-Rosary
Cement City
Chesaning-Our Lady
Coldwater-St. Charles

Columbiaville
Copemish
Covert
Deerfield
Detroit-All Saints

Detroit-Boys Republic
Detroit-Country Day
Detroit-St. Agnes
Detroit-St. Anne
Detroit-St. Josaphat

Detroit-Thurston
East Tawas-St. Joseph
Elberta
Essexville-St. John
Fife Lake

Flint-Hoover
Flint-Mich. Sch. for Deaf
Flint-St. Johns
Frankenmuth
Frederic

Freeport
Freesoil
Gaines
Genesee
Glen Arbor

Gd. Rapids-Rogers
Grosse Pte-Det. Univ. Sch.
Harbor Beach-Lake Huron
Hersey
Hillman

Holton
Honor
Hoxeyville
Hubbardston-St. John
Ionia-SS. Peter & Paul

Johannesburg
Kinde
Kingsley
Kingston
Lake Leelanau-St. Mary

Luther
McBain-Christian
Mackinaw City
Manistee-St. Joseph
Maple City

Martin
Mecosta
Merritt
Millersburg
Mt. Clemens-St. Louis

Mt. Morris-St. Mary
Mt. Pleasant-Sacred Heart
New Baltimore-St. Mary
New Era
New Lothrop-St. Michael

Onkama
Otisville
Otter Lake
Petoskey-St. Francis
Pinconning-St. Michael

Class D High Schools

114 Non-C.A. H.S.
not sending Fr.

Pontiac-Dublin
Port Hope
Posen
Rapid City
Reese

Rose City
Ruth-SS. Peter & Paul
Saginaw-Holy Family
Saginaw-Rosary
Saginaw-Sacred Heart

Saginaw-St. Joseph
St. Joseph-Catholic
Sand Lake
Schoolcraft
Spring Arbor

Stevensville
Tekonsha
Twining
Vanderbilt
Vestaburg

Walkerville
Weidman
West Branch-St. Joseph
Winegars

Brimley
Cedarville
Chassell
Cooks
Engadine

Ironwood-St. Ambrose
Laurium-Sacred Heart
Negaunee-St. Paul
Republic
Vulcan

Class E High Schools
(under 75 students)

1 C.A. H.S. sending
Fr. to MSU, Fall 1953

Trenary

1

1 Fr.

1 C.A. H.S. not
sending Fr.

Bergland

2 Non-C.A. H.S. sending
Fr. to MSU, Fall 1953

Perkins
Watersmeet

1

2

3 Fr.

17 Non-C.A. H.S.
not sending Fr.

Alpha
Amasa
Carney
Champion
Channing

Chassell-Doelle
Daggett
De Tour
Grand Marais
Hulbert

Iron River-Betz
Marenisco
Michigamme
Nahma
National Mine

Rockland
Trout Creek

15 Unclassified High Schools
Sending Freshmen to MSU
Fall 1953

| | |
|--|----------|
| Big Rapids-Ferris Institute High | 1 |
| Bloomfield Hills-Kingswood | 1 |
| Detroit-Catholic Central for Girls | 1 |
| Detroit-Commerce High | 2 |
| Detroit-Dominican | 4 |
| | |
| Detroit-Immaculata | 9 |
| Detroit-Our Lady of Mercy | 3 |
| Detroit-St. Elizabeth | 1 |
| Grand Rapids-Marywood | 1 |
| Grand Rapids-Mt. Mercy | 2 |
| | |
| Grosse Pte Farms-Academy of Sacred Heart | 2 |
| Lansing-Technical | 2 |
| Monroe-St. Mary's Academy for Girls | 3 |
| St. Ignace-Ursuline Academy for Girls | 1 |
| St. Patrick-Parnell | <u>1</u> |

34 Fr.

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