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An evaluation of teacher trainees at the University of Massachusetts, 1938-48.

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AN EVALUATION OF TEACHER TRAINEES AT THE UNIVERSITY OF MASSACHUSETTS 1938 - 48

JACKOWSKI - 1950

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By

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INTRODUCTION

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INTRODUCTION

Education in the United States has always been considered a state function. In order to fulfill the responsibility of furnishing high quality instruction in the public schools and to raise the standards of the teaching profession, the state has found it necessary to establish and to control certification requirements for teachers. With the exception of Massachusetts, all of the states have now enacted laws governing the certification of teachers. However, since these statutes constitute minimum requirements, no state prohibits local authorities to establish higher standards than those prescribed by law. Hence, the requirements of the Local Board of Education often reach far beyond the statuatory minimums; this is especially true of the larger city systems.[1]

Trend in Certification -- Although a definite trend to increase certification requirements has existed for the past twenty-five years, the most significant advances have occured during the last decade. The academic requirements[2] for certification on the secondary level have now been increased to the point that only one state (Oklahoma) continues to grant high school certificates to teachers with less

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(1) Reeder, W.G. The Fundamentals of Public School Administration. pp. 178-180.

(2) "Teachers in the Public Schools." N.E.A. Research Bull. XXVII, no. 4 (December, 1949) p. 130.

than four years of college training, while four states (Arizona, California, New York, Washington) require five years.

A tendency on the part of both local and state boards to increase the amount of professional education and teaching experience needed for certification has also been in evidence. A recent survey of the United States[3] indicates the following: (1) the minimum state requirements in professional education range from 9 to 27 semester hours with a median of 18 semester hours; (2) practice (student) teaching requirements are now made by all but five states, the range being 2-10 semester hours with a mean of 4.3 semester hours. Local demands, in this respect, surpass state standards. In general, the larger city systems are in a position to offer higher salaries than those of the smaller school systems; therefore, they feel that this substantial salary differential is sufficient justification for requiring candidates to possess from one to two years of actual teaching experience.[4] Moreover, it is not uncommon to find that these larger cities also require a Master's degree of new appointees.

Increasing Complexity of Teacher Selection -- As a

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(3) Frazier, B. W. Summary of Teacher Certification Requirements, 1947-48. pp. 3, 5.

(4) Reeder, W.G. op. cit. p. 180.

consequence of the progress in elevating the standards of the teaching profession achieved thru the efforts of the State and Local Boards of Education and the organized teaching profession, the problem of teacher selection has become more complex. To augment this condition, we find that since World War II, a nation-wide campaign designed to awaken the general public to the full realization of the importance of the teacher in our democracy has gained a surprising degree of success. In all probability, we shall find the public exerting increasingly more influence in procurring better teaching personnel in the future.

Need for Evaluating Teacher Trainees -- If our schools are to prepare our youth for successful participation in all phases of our democratic society,[5] and if Education is to keep pace with the advances in Industry and Science, it is imperative that teacher training institutions keep abreast of the demands of society. With the increasing emphasis on more and better professional training for teachers, it becomes evident that these institutions must make provisions for evaluating their educational products.

In this study, such an evaluation shall be made for the Department of Education at the University of Massachusetts. It is apparent that the results of an investigation of one institution do not lend themselves to wide-scale

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(5) Duggan, S. History of Education. pp. 302-306.

application. However, it is hoped that, in addition to the one concerned here, other teacher training institutions of the Commonwealth will find this study helpful in evaluating their efforts to produce teachers with training commensurate with the demands of society. It is further hoped that the study will offer administrators and supervisors an additional "yardstick" to the character and the proficiency of the training of present day teachers and will enable future members of the teaching profession to anticipate, to a certain degree, the qualifications that they will be expected to meet.

CHAPTER II

STATEMENT OF PROBLEM AND OUTLINE OF PROCEDURE

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There exists a felt need on the part of the Department of Education at the University of Massachusetts for an analysis of the records of past teacher trainees. This need is an outgrowth of several pressing conditions. First, the recent progress in raising the standards of the teaching profession, which has already been discussed, makes such a study of paramount importance. Second, the universal shortage of teachers, which is most critical on the elementary level at the present time and which will become more severe on the secondary level in the next decade, indicates a need for an effective recruiting program. Therefore, an analysis of the background and past performance of teacher trainees should prove beneficial in formulating such a program. Third, the influx of Education students expected in the future will necessitate a rigid system of elimination in order to eliminate those that prove to be unfit for teaching during the training period. It is hoped that this study will shed some light on the standards that must be maintained during the training process. These, then, are the broad objectives that have prompted this study.

Statement of Problem -- This study shall concern itself with the examination and the analysis of the college records of 139 students who have prepared for the teaching profession at the University of Massachusetts during the period 1938-48. It shall attempt to ascertain the general charac-

teristics pertaining to the background and the training of these students and to determine statistically the central tendencies and relationships that may be present in the records of their training.

Limitations -- It is fully realized that academic records do not reveal all the characteristics that are desirable in a good teacher and therefore, that limitations exist in such records. Personality traits, disciplinary ability, voice quality, and planning ability cannot be measured by such means but scholastic standing and professional preparation are equally important and can be accurately determined.

Subjects and Materials -- Since academic records constitute the only source of impartial data that remain after students graduate, and since they are particularly suited to statistical methods, this medium was chosen as a basis for the study.

A list of students who possessed sufficient preparation to have warranted recommendation for practice teaching experience was obtained from the Department of Education. A number of these who were transfer students, graduate students, or who otherwise possessed incomplete records were deleted from this list; a total of 139 with sufficient data for study remained. The complete college records of these students in the Office of the University Registrar were made available for study.

Collection of Data -- The next step in the procedure consisted of the collection of all necessary data from the files of the Registrar. A 5" x 8" card form was found convenient for this purpose. A sample form is shown in Appendices I and II. Use of this form permitted the collection of the following information for each individual concerned in the study:

Front Side:

1. Name and Sex
2. Major
3. High School Attended
4. Class
5. Rank on Entrance Examination
6. Position in Graduating Class
7. Average 4 yr. Grade
8. Average Grades by Semester and by Year
9. Number of Courses Pursued in Major
10. Average Grade in Major
11. Number of Courses Pursued in Education
12. Average Grade in Education
13. Type of Education Courses Pursued and Grade Attained
14. Number and Type of Education Courses taken before Practice Teaching
15. Comments -- Specializations, Irregularities

Reverse Side:

16. Activities -- Social, Scholastic, Administrative
17. Clubs
18. Evidence of Leadership
19. Athletics

Definition of Terms -- In order to avoid misunderstandings later in the discussion, a certain number of terms involved in the study shall be defined here.

"Passing Grade" -- The University employs the percentage system of marking; a grade of 60 signifies a passing grade.

"Rank on Entrance Examination" -- A General Aptitude Examination is given to entering Freshmen; an individual's raw score on this examination is transformed to a rank number which denotes his standing in relation to the rest of his class. The ranks range from 0.000 to 1.000, the latter being the highest.

"Position in Graduating Class" -- Each individual's position in the graduating class is based on his 4 yr. average grade; on the college record this appears as a ratio, e.g. 120/225. For purpose of comparison, it was necessary to transform these ratios to ranks with the same range as the Ranks on the Entrance Examination. This was easily accomplished by changing each ratio to a decimal and subtracting it from 1.000. Thus, the ratio above transformed into a rank number becomes 1.000 - .533 or 0.467.

Statistical Procedure -- When all the data were collected and transformed into uniform terms, the statistical evaluations and their graphic representations were made in the following order:

1. Frequency Distributions
2. Computation of Measures of Central Tendency and Dispersion
3. Plotting of Frequency Distributions
4. Computation of Coefficients of Correlation
5. Computation of Equations of Lines of Regression
6. Plotting of Lines of Regression

Outline of Discussion -- Having completed the statistical determinations and prepared the necessary graphic illustrations, it now remained to organize the material

into logical categories preparatory to discussion. In the ensuing discussion, a chapter shall be devoted to each major phase of the study.

CHAPTER III

BACKGROUND AND GENERAL INFORMATION

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BACKGROUND AND GENERAL INFORMATION

An examination of the data collected from the college records reveals several general characteristics pertaining to the teacher trainees, their origin and background, and the nature of their training.

Ratio of Men to Women -- Unlike European countries, the United States has a preponderance of women teachers in the elementary and the secondary schools. In 1940, the ratio of men to women teachers on the secondary level was approximately 1.0 to 1.4[1] Of the 139 individuals concerned in this study, 42 were men and 97, women; this yeilds a ratio of 1.0 to 2.3, indicating a still greater majority of women. This is, of course, partly due to the curtailed enrolment of men during the war years; however, the need to recruit more men teachers is indicated.

Source of Teacher Trainees -- Keeping in mind the broad objectives set forth in Chapter II, it seems desirable to investigate the origin of teacher trainees. In formulating a recruiting program, it would be useful to know the proportion originating in the small towns, in the larger towns, and in the cities. This is shown in Table I. The classification used in Table I is the one adopted by the Massachusetts Department of Education.[2]

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(1) Bent, R.K. and Kronenberg, H.H. Principles of Secondary Education. p. 520.

(2) Salaries of Teachers in the Public Schools of Massachusetts. Mass. Dept. of Ed. Bull. No. 5.

TABLE I

Distribution of Teacher Trainees Originating in Communities of Various Sizes.

Size of Community	Frequency	Percent
City	65	47.4
Towns over 5,000 population	52	38.0
Towns under 5,000 population	20	14.6
*Total	137	100

* 2 cases undetermined -- no record.

From Table I it is to be noted that 47.4% of the candidates came from cities and that 85.4% came from cities and the larger towns combined. This evidence shows that the majority of future candidates will originate in urban communities. Furthermore, it is an established fact that most teachers receive their first appointments in small towns; thus, if 85% of these individuals come from urban environments, some attention should be given trainees in matters pertaining to adjustment to rural conditions and to operational procedures in the small school.

Distribution of Trainees by Classes -- The distribution of the 139 teacher trainees by classes is shown in Table II. It is to be noted that there is a decline in the number of trainees for the years 1944-46 and an influx thereafter. This irregularity seems to parallel and

therefore, to be influenced by the fluctuation in enrolment caused by World War II. The substantial increase in enrolment characterized by the last two years of Table II may be an indication of a trend. Should this trend develop, it would present an excellent opportunity for the University to exercise a more critical selection of candidates and to maintain a higher standard of performance during the training period.

TABLE II

Distribution of Teacher Trainees by Classes

Class	Number of Trainees	Percent
1941	17	12.3
1942	19	13.7
1943	17	12.3
1944	12	8.6
1945	13	9.3
1946	11	7.9
1947	21	15.1
1948	29	20.8
Total	139	100
Median	17	

Rank on Entrance Examination -- The distribution of Ranks on the Entrance Examination is shown in Table III.

TABLE III

Distribution of Ranks on Entrance Examination

Interval	Frequency	Cumulative Frequency	Cumulative Frequency %
.900 - 1.000	17	121	100
.800 - .899	15	104	86
.700 - .799	11	89	74
.600 - .699	18	78	65
.500 - .599	8	60	50
.400 - .499	14	52	43
.300 - .399	8	38	31
.200 - .299	8	30	25
.100 - .199	15	22	18
0.000 - .099	7	7	6
*Total	121	--	--

Median = .603
* 18 cases undetermined -- no record.

It is not within the scope of this study to determine the validity or the reliability of the Entrance Aptitude Examination; however, if we assume it to be reliable, we see from Table III that there is a wide range in ranks for

students that elect to train for the teaching profession. The median rank of 0.603 is significant in that it indicates that at least 50% of the candidates ranked above 0.600. The mean rank for this distribution is 0.550 and the standard deviation, 0.288. In relative terms, this means that at the present time a random sampling or a representative group of students is being trained for the teaching profession at the University. If the University is to train teachers with abilities commensurate with the demands of present day society, a greater degree of selectivity should be considered.

Rank in Graduating Class -- The distribution of Ranks in the Graduating Class is similar to that of the Ranks on the Entrance Examination; this is shown in Table IV. The median rank for the distribution is .535 as compared with .603 for the Ranks on the Entrance Examination; the mean rank is .524 compared with .550; the standard deviation, .301 compared with .288. Chart I gives a graphical comparison of these two distributions.

In relative terms, we see from Table IV and Chart I that the distribution of Ranks in the Graduating Class substantiates the observations that had been made under the discussion of the Ranks on the Entrance Examination; ie., that a more critical selection of candidates should be exercised and also that a higher standard of performance be maintained during the training process.

TABLE IV

Distribution of Ranks in Graduating Class

Interval	Frequency	Cumulative Frequency	Cumulative Frequency %
.900 - 1.000	18	121	100
.800 - .899	10	103	85
.700 - .799	15	93	77
.600 - .699	11	78	65
.500 - .599	10	67	55
.400 - .499	12	57	47
.300 - .399	11	45	37
.200 - .299	10	34	28
.100 - .199	10	24	20
0.000 - .099	14	14	12
* Total	121	--	--

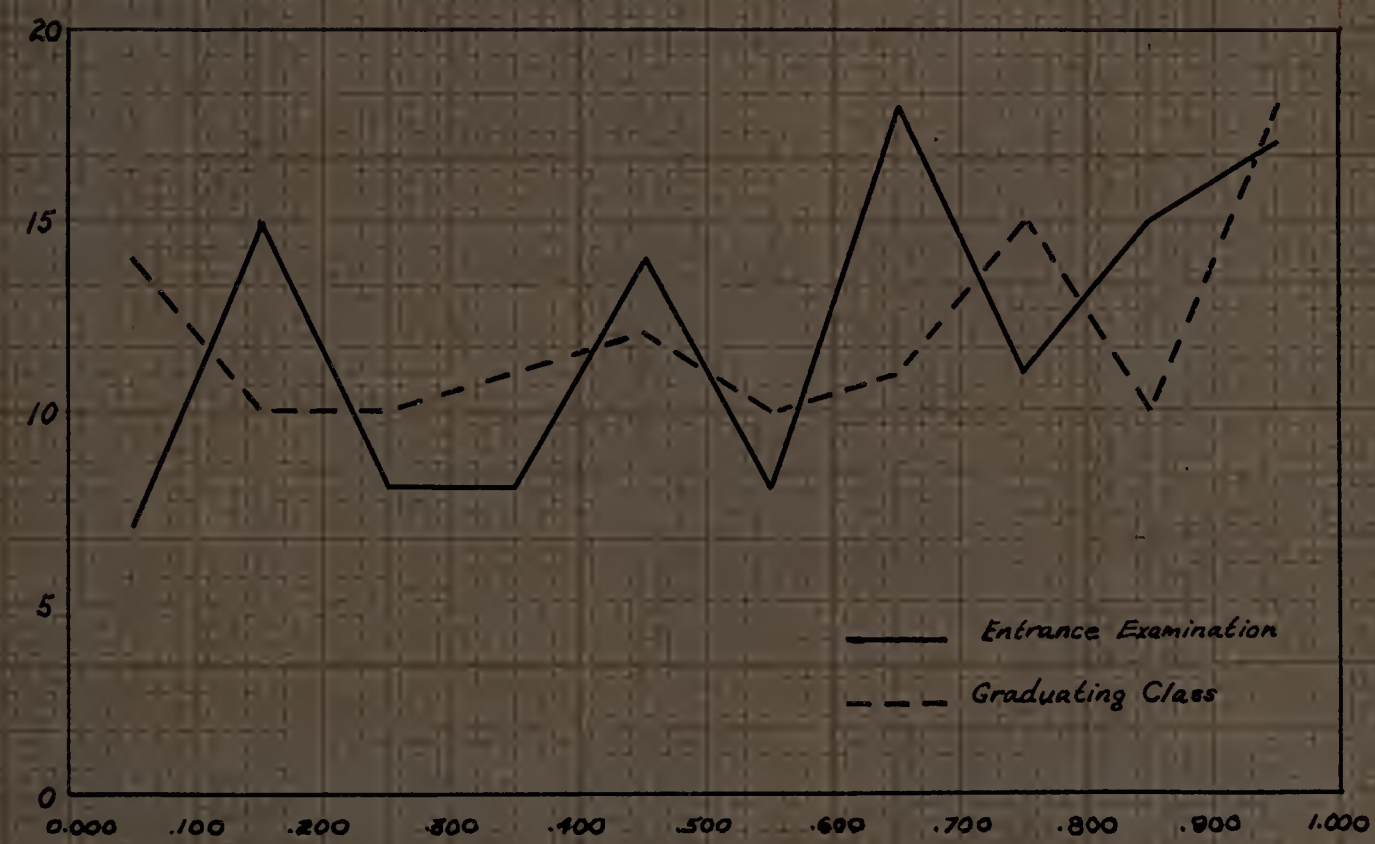
Median = .535

* 18 cases deleted in order to make data comparable to Ranks on Entrance Examination.

Average 4 yr. Grade -- Since the Average 4 yr. Grade is probably the best indicator of academic ability and achievement, a frequency distribution of these grades for the 139 teacher trainees should illustrate these qualities for the group as a whole. Chart II represents this distribution. In Chart II, a supplementary horizontal scale in terms of standard deviation units from the mean has been added; the mean average 4 yr. grade being 78.26. It is to

CHART I

Comparison of Distributions of Ranks on Entrance Examination and Ranks in Graduating Class.



For Ranks on Entrance Examination:

Median = 0.603

$\bar{X}$ = 0.550

σ = 0.288

For Ranks in Graduating Class:

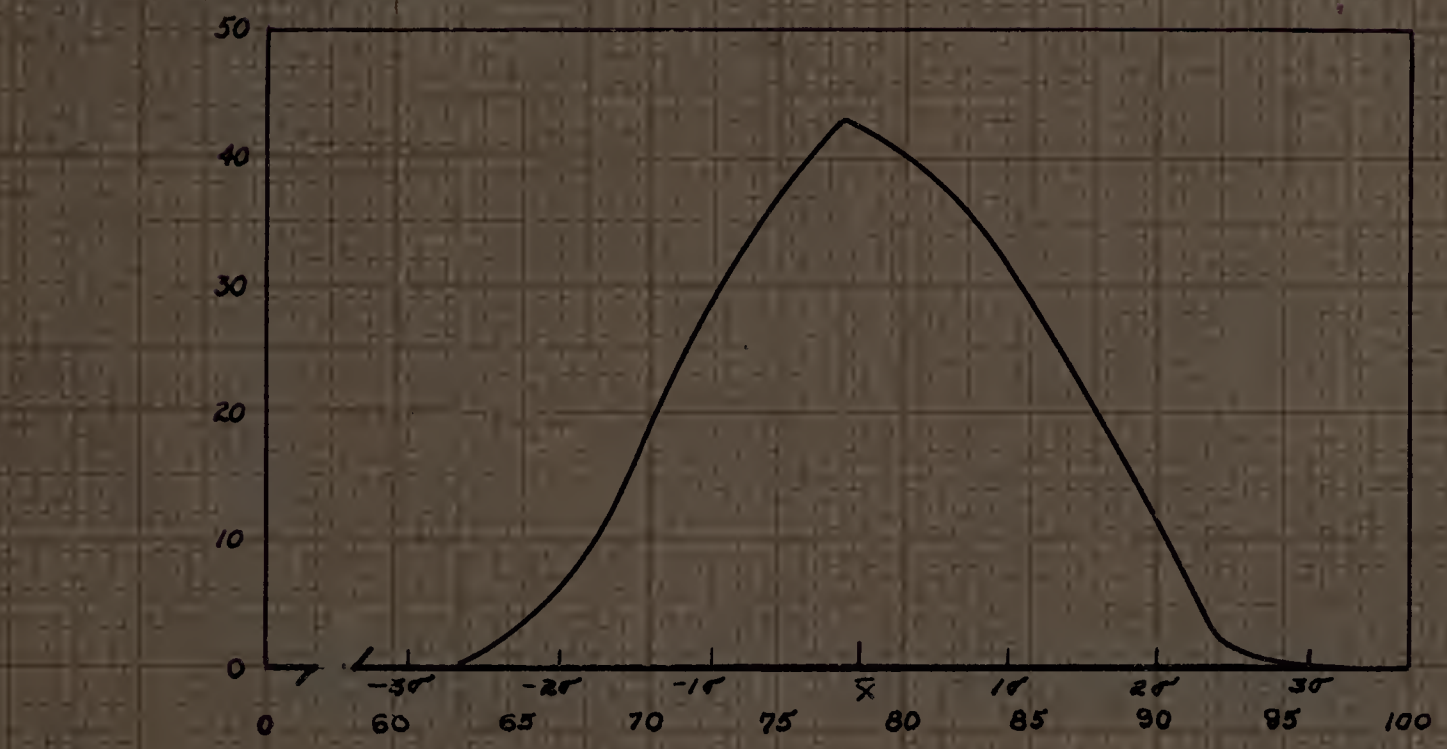
Median = 0.535

$\bar{X}$ = 0.524

σ = 0.301

CHART II

Distribution of Average 4 yr. Grades.



$\bar{X} = 78.26$

$\sigma = 5.845$

be noted that the distribution is nearly normal and hence, that approximately 68% of the teacher trainees received an average grade in the range 72.41 - 84.11, ie., 78.26 $\pm$ 1 σ. A range of $\pm$ 2 σ, or 66.56 - 89.96, includes approximately 95% of the individuals.

The above statistical determinations indicate that the academic ability and achievement of the group of trainees concerned in this study corresponds very closely to a representative group of college students. The normalcy exhibited in these measures again points out that a random sampling of students is being trained for the teaching profession at this institution. Had a high degree of selectivity been exercised, the distribution of Chart II would have been skewed, possessing higher frequencies in the upper part of the grade scale.

Summary of Chapter -- It was found that 85% of the teacher trainees came from urban communities. Furthermore, since a trainee's first position will, in the majority of cases, be in a small town, some provision for adjustment to conditions in the small school and to rural life should be made during the training period.

The Ranks on the Entrance Examination, the Ranks in the Graduating Class, and the Distribution of the Average 4 yr. Grades all indicate that the individuals training for the teaching profession at the University constitute a representative group of college students. The need for a more

selective procedure in choosing candidates is indicated. It was observed that the increase in enrolment during the last two years concerned in this study may mark the beginning of a trend. Such a trend would make a more selective system feasible and would also offer an opportunity to establish higher standards during the training process. Thru such improvements, a greater number of superior teachers could be produced annually.

CHAPTER IV

THE MAJOR FIELDS

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THE MAJOR FIELDS

Having determined the general characteristics exhibited by the original data, we are now prepared to examine the more specific aspects. The discussion in this chapter shall deal with the characteristics that pertain to the major fields of study.

Ratio of Liberal Arts to Science Majors -- It is interesting to find that the majority of the trainees majored in the Liberal Arts; of the 139 individuals, 100 majored in the Liberal Arts and 39 in the Physical and Biological Sciences. This yeilds a ratio of approximately 2.6 to 1. Whether or not this ratio represents a proper balance is questionable. In any event, it should be observed closely in the future in order to insure a sufficient number of Science trainees.

Distribution of Specializations -- In accord with the above ratio, a distribution of the specialized fields of study reveals that the two fields with the highest frequencies were English and History. The distribution can be found in Table V. In the Sciences, it is to be noted, Mathematics was highest with a frequency of 18.

In connection with the distribution of specializations, it also seemed desirable to determine the average number of courses that were pursued in each major field. This information is found in column 3 of Table V. It is to be observed that the range in the number of courses was 6-12, with a mean of 7.8.

TABLE V

Distribution of Specialized Fields of Study and the Average Number of Courses Pursued in each Field

Specialization	Frequency	Average Number of Courses Pursued
English	42	9.5
History	33	8.8
Mathematics	18	5.9
Physical Education	8	12.1
Psychology	6	7.0
Zoology	6	7.5
Modern Languages	6	9.3
Chemistry	4	5.8
French	3	6.7
Entomology	2	10.5
Education	2	5.5
Botany	2	7.0
Sociology	1	7.0
Physics	1	6.0
Economics	1	8.0
Agriculture	1	10.0
Horticulture	1	7.0
Bacteriology	1	7.0
Recreational Leadership	1	8.0

Average Grade in Major -- In Chapter III, an indication of general academic ability and achievement of the

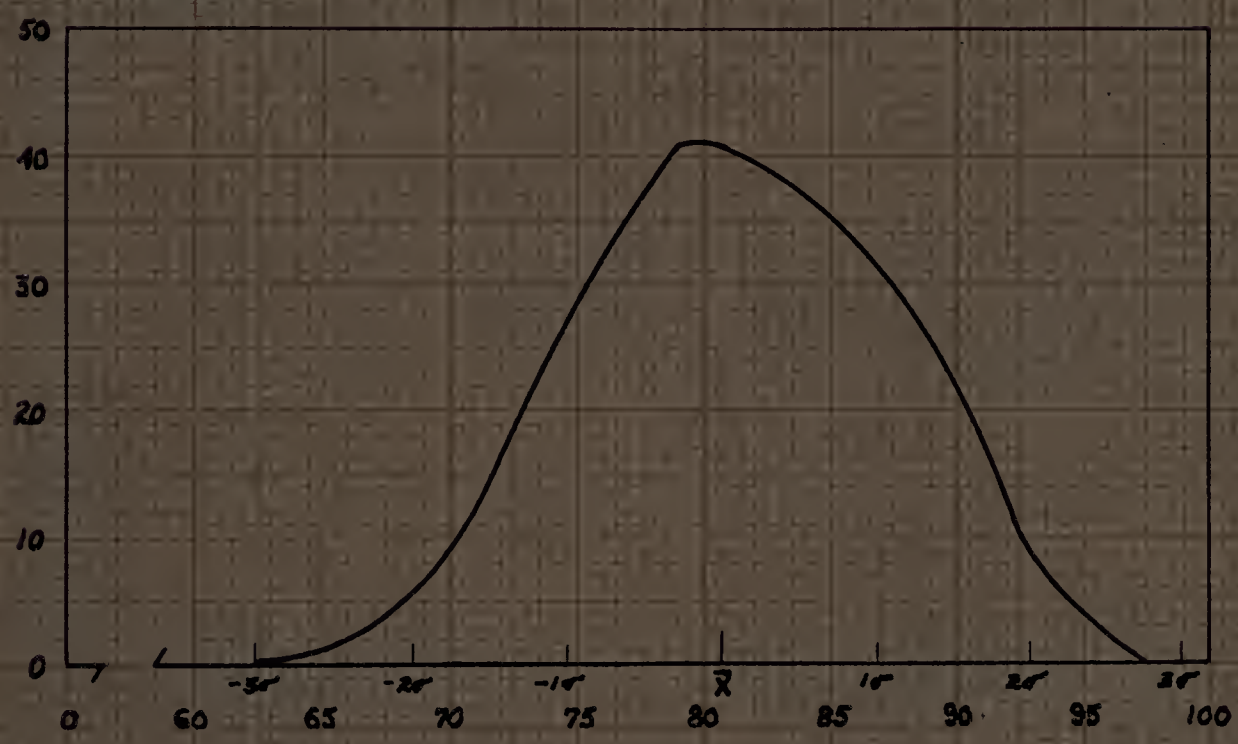
teacher trainees was obtained thru the study of the average 4 yr. grade. In like manner, an analysis of the Average Grade in the Major should reflect the proficiency and the scholastic standing of these individuals with respect to their specialized fields of study. This distribution of the Average Grades in Major is illustrated by Chart III. Here again, a supplementary horizontal scale in terms of standard deviation units has been added. The mean grade for the distribution was 80.67; the standard deviation, 6.130. This distribution also approaches the normal, thus the customary percent of cases for the various standard deviation ranges may be assumed safely. A range of $\pm 1\sigma$ represents grades from 74.54 to 86.80; a range of $\pm 2\sigma$, 68.41 to 92.93. In Chapter VI, this distribution shall be compared with the distributions of the Average 4 yr. Grade and the Average Grade in Education.

The above statistical measures indicate only slightly better than average performance for the group as a whole. The criticisms presented under the discussion of the Average 4 yr. Grade apply here as well. The frequency curve for a select group would show a marked skewness; since the curve of Chart III is nearly normal, it is to be concluded that a more stringent selective process is needed.

Summary of Chapter -- It was found that the ratio of Liberal Arts to Science Majors was 2.6 to 1. This may or may not be a proper balance and warrants close attention

CHART III

Distribution of Average Grades in Major.



$\bar{X} = 80.67$

$\sigma = 6.130$

in the next few years.

English and History were the most frequent specializations for the Liberal Arts students, while Mathematics was most frequently elected by Science majors. The range in the number of courses for the various specializations was 6 to 12 with a mean of 7.8 courses.

From the study of the distribution of the Average Grades in Major it was found that the statistical determinations point out slightly better than average achievement and ability for the group as a whole. Again the evidence points to little or no selectivity in procurring teacher trainees at this institution.

CHAPTER V

PROFESSIONAL EDUCATION

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PROFESSIONAL EDUCATION

In continuing the investigation of the more specific aspects of the original data, Chapter V shall deal with the characteristics concerning Professional Education. By following a similar procedure to that of the previous chapters, an attempt will be made to ascertain the amount and the nature of the professional training of the teacher trainees, as well as an indication of the degree of proficiency attained. Furthermore, the amount and type of training received before Practice Teaching was undertaken will be determined.

Amount of Training in Education -- The amount of training in Education received by the trainees can be illustrated by a frequency distribution of the number of courses pursued. This is shown in Table VI. It is to be observed that 59 individuals, or 42%, had taken five or more courses in Education. The average number of courses for the distribution was 4.1; the median, 4.7.

Amount of Training before Practice Teaching -- Table VI also gives a distribution of the amount of training prior to Practice Teaching. The highest frequency in this case was 48 indicating that approximately 35% of the trainees had taken two courses in Education before their practice teaching experience. The median number of courses pursued prior to Practice Teaching was 2.5

TABLE VI

Distributions of the Number of Courses pursued in Education and the Number of Courses pursued prior to Practice Teaching

Number of Courses	Total Training (Frequency)	Training before Practice Teaching (Frequency)
0	0	*19
1	4	25
2	7	48
3	33	32
4	36	15
5	51	--
6	6	--
7	2	--
Total	139	139
Median	4.7	2.5

* This includes 10 students who trained under the "One Semester Plan", ie., one semester devoted exclusively to Courses in Education.

Type of Training in Education -- An insight to the type of training can be obtained from Table VII which represents a frequency distribution for the various courses in Education that were taken by the trainees. The Table is self explanatory.

Type of Training in Education Prior to Practice Teaching -- In order to facilitate comparison, the distribution

of the courses in Education that were taken prior to Practice Teaching was incorporated in Table VII.

TABLE VII

Distributions of Courses in Education and Courses in Education pursued prior to Practice Teaching

Course	Total Training (Frequency)	Training Before Practice Teaching (Frequency)
Practice Teaching	139	--
Methods	115	96
Principles of Secondary Education	80	59
History of Education	70	40
Curriculum	56	23
Tests and Measurement	43	38
Secondary School Management	25	25
Classroom Management	17	11
Psychology in Teaching	11	--
Secondary School Administration	6	5
Vocational Education in Agriculture	1	1

Average Grade in Education -- In the previous two chapters, it was found convenient to study the distributions of the Average 4 yr. Grade and the Average Grade in the Major

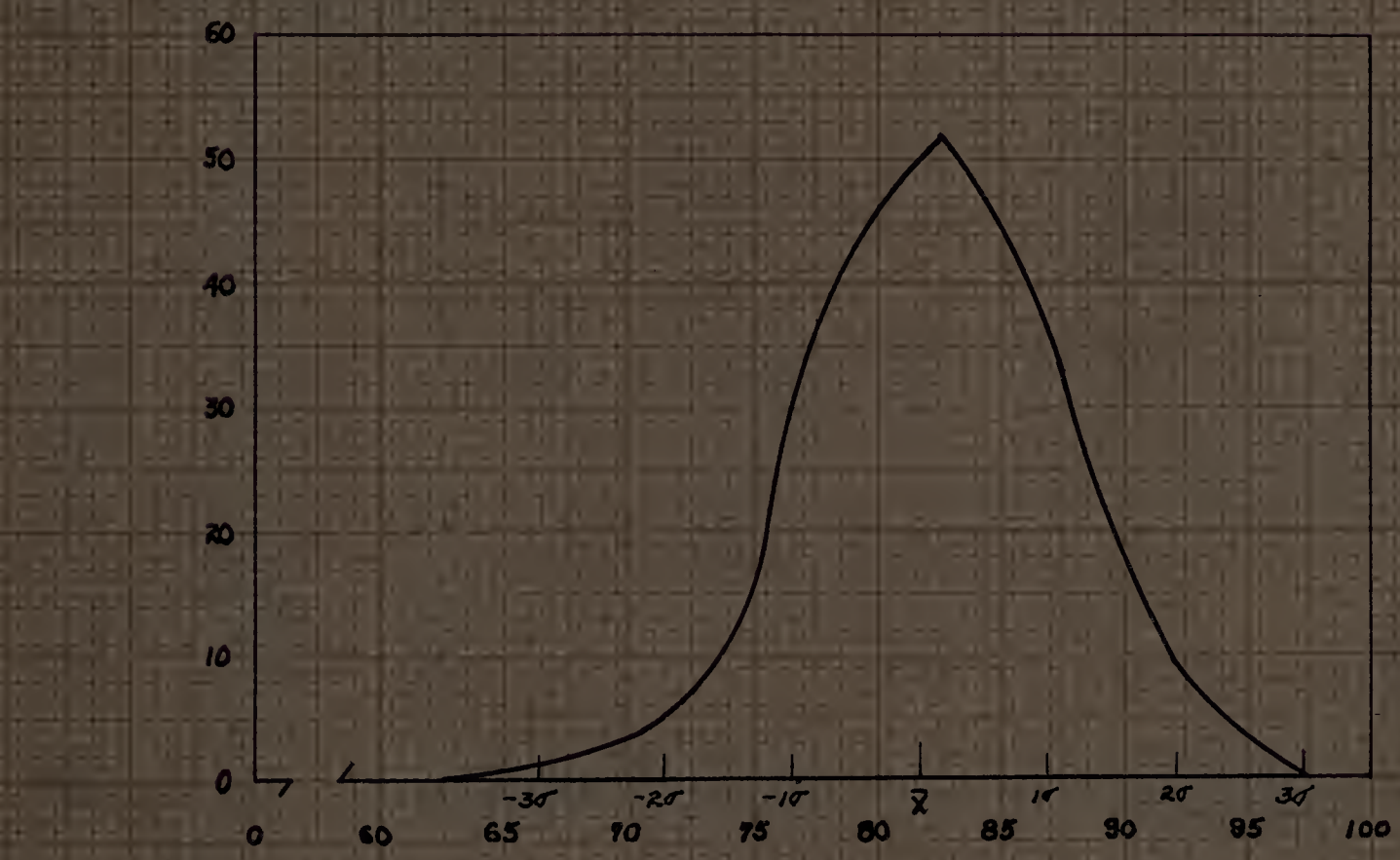
Field in order to obtain an indication of the achievement and proficiency of the trainees. Chart IV, representing the distribution of the Average Grade in Education, is presented here in a similar manner. The mean grade for the distribution was 81.72 and the standard deviation, 5.150. Since the curve of Chart IV exhibits normal characteristics, the conditions ascribed to the normal distribution apply here. A range of $\pm 1\sigma$ represents grades from 76.57 to 86.87; a range of $\pm 2\sigma$, 71.42 to 92.02. A detailed comparison of the distributions of the Average Grade in Education, the Average Grade in Major, and the Average 4 yr. Grade is given in the next chapter.

The rather high mean grade and the small dispersion of the distribution tend to indicate that a somewhat higher degree of achievement has been realized in Education than has been shown in reference to the Average 4 yr. Grade and the Average Grade in the Major. However, a wide range of ability is still indicated for the group of trainees by the normalcy of the frequency curve. This evidence corroborates the observations made in the previous two chapters, ie., the University is not procurring a select group of students to train for the profession.

Summary of Chapter -- 42% of the trainees had taken 5 or more courses in Education, the median being 4.7. The median number of courses pursued prior to Practice Teaching was 2.5

CHART IV

Distribution of Average Grades in Education.



$\bar{X} = 81.72$

$\sigma = 5.150$

Methods, Principles of Secondary Education, History of Education, Curriculum, and Tests and Measurement, in that order, were the courses most frequently pursued.

The distribution of the Average Grade in Education substantiates the findings of the previous chapters in regard to selection of candidates. Here again, we find evidence that points toward the need for more selectivity. A highly select group of trainees should be chosen annually if the broad objectives set forth in Chapter II are to be realized.

CHAPTER VI

RELATIONSHIPS

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RELATIONSHIPS

An analysis of the material that has been described in the previous chapters reveals a number of important relationships. These shall be illustrated in this chapter by a comparison of the frequency distributions, the determination of coefficients of correlation for the various combinations of distributions, and the calculation of the equations of the lines of regression and their graphic representations.

Comparison of Frequency Distributions -- A convenient method for determining relationships among several frequency distributions lies in the comparison of their respective statistical measures of central tendency and dispersion. Table VIII gives a comparison of the means, the standard deviations, and the coefficients of variation for the distributions of the Average 4 yr. Grade, the Average Grade in Major, and the Average Grade in Education. Since the dispersion of a distribution is related to the mean of that distribution, the standard deviation, alone, often does not give a true indication of dispersion. Hence, the coefficient of variation ($V = \frac{\sigma_x}{\bar{X}}$) has been included in Table VIII.

It is to be observed that the mean grade of 81.72 for the Education distribution is the highest of the three and that its standard deviation and coefficient of variation are the lowest. Thus, the grades in Education are grouped

more closely but this grouping takes place about a higher mean than in the case of the other two distributions.

TABLE VIII

Comparison of the Mean, the Standard Deviation, and the Coefficient of Variation for the Distributions of the Average 4 yr. Grade, the Average Grade in Major, and the Average Grade in Education.

Distribution	Mean	Standard Deviation	Coeff. of Variation
Average 4 yr. Grade	78.26	5.845	.75
Average Grade in Major	80.67	6.130	.76
Average Grade in Education	81.72	5.150	.63

Chart V represents a graphic comparison of the distributions of Table VIII.

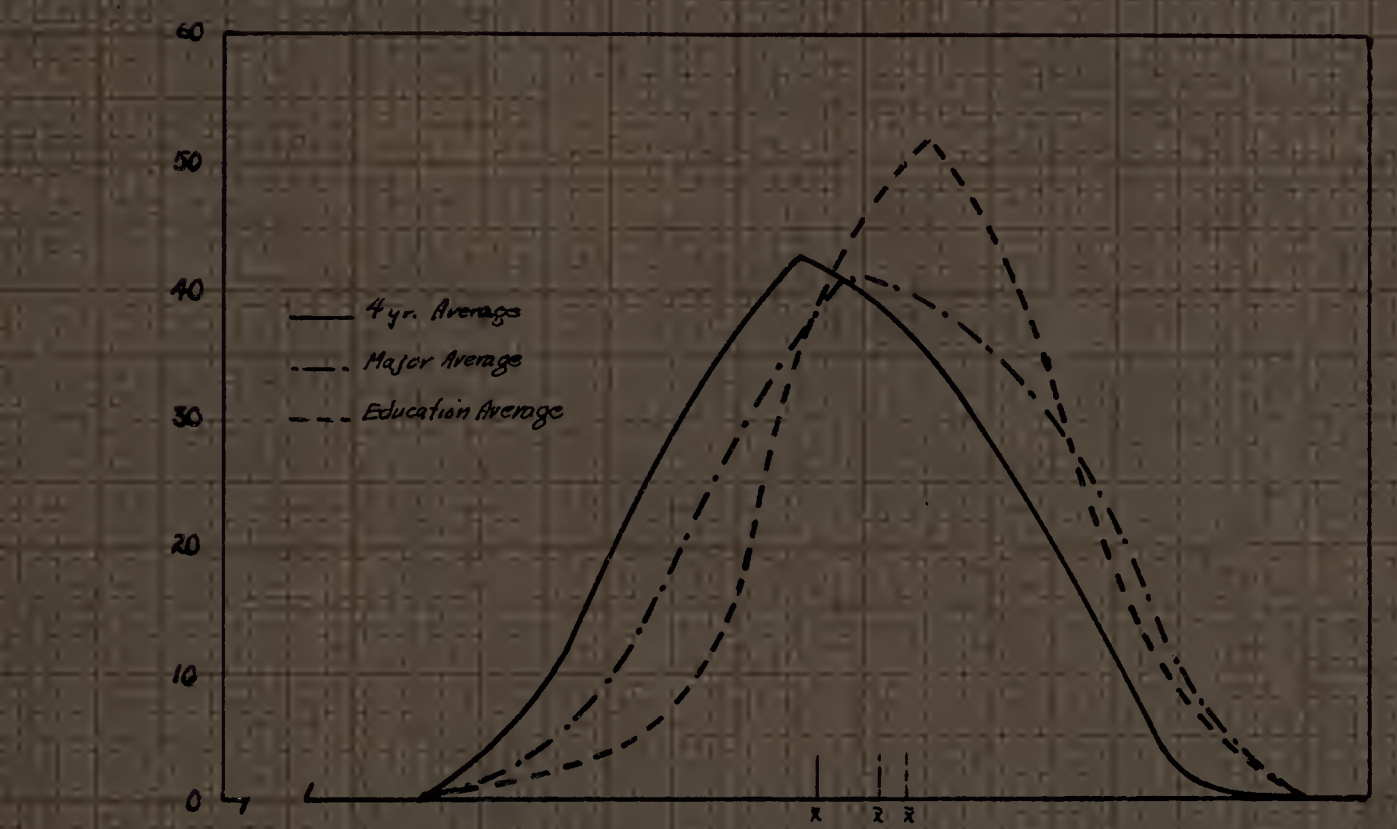
Coefficients of Correlation -- The coefficients of correlation determined for the various combinations of the distributions discussed above are as follows:

Average 4 yr. Grade and Average Grade in Major	.69
Average 4 yr. Grade and Average Grade in Education	.68
Average Grade in Major and Average Grade in Education	.48

The Correlation Tables may be found in Appendices III, IV, and V, respectively.

CHART V

Comparison of Distributions of the Average 4 yr. Grade, Average Grade in Major, and Average Grade in Education



Lines of Regression -- The reader may doubt whether the coefficients of correlation are sufficiently large to permit safe prediction; hence, when the lines of regression were computed and plotted, the standard error of estimate, S_y, was utilized to indicate a range of reliability. In this connection, it is to be remembered that S_y has the same function with respect to the line of regression as has σ, the standard deviation, with respect to the frequency distribution. Therefore, the probability is approximately .68, or 68 chances in 100, that the predicted value indicated by the line of regression will not be in error by more than S_y.[1] A range of $\pm S_y$ has been indicated on all charts involving lines of regression.

The lines of regression illustrated in Charts VI, VII, and VIII, have been computed directly from the Correlation Tables (Appendices III, IV, & V) by finding the best fitting lines to the averages of the columns and rows respectively. It is to be noted that this procedure gives the identical lines of regression that would have been obtained had a scatter diagram of the original data been employed instead of the correlation table.[2] However, it must be remembered that from the standpoint of the correlation table, the line of regression of y on x estimates the aver-

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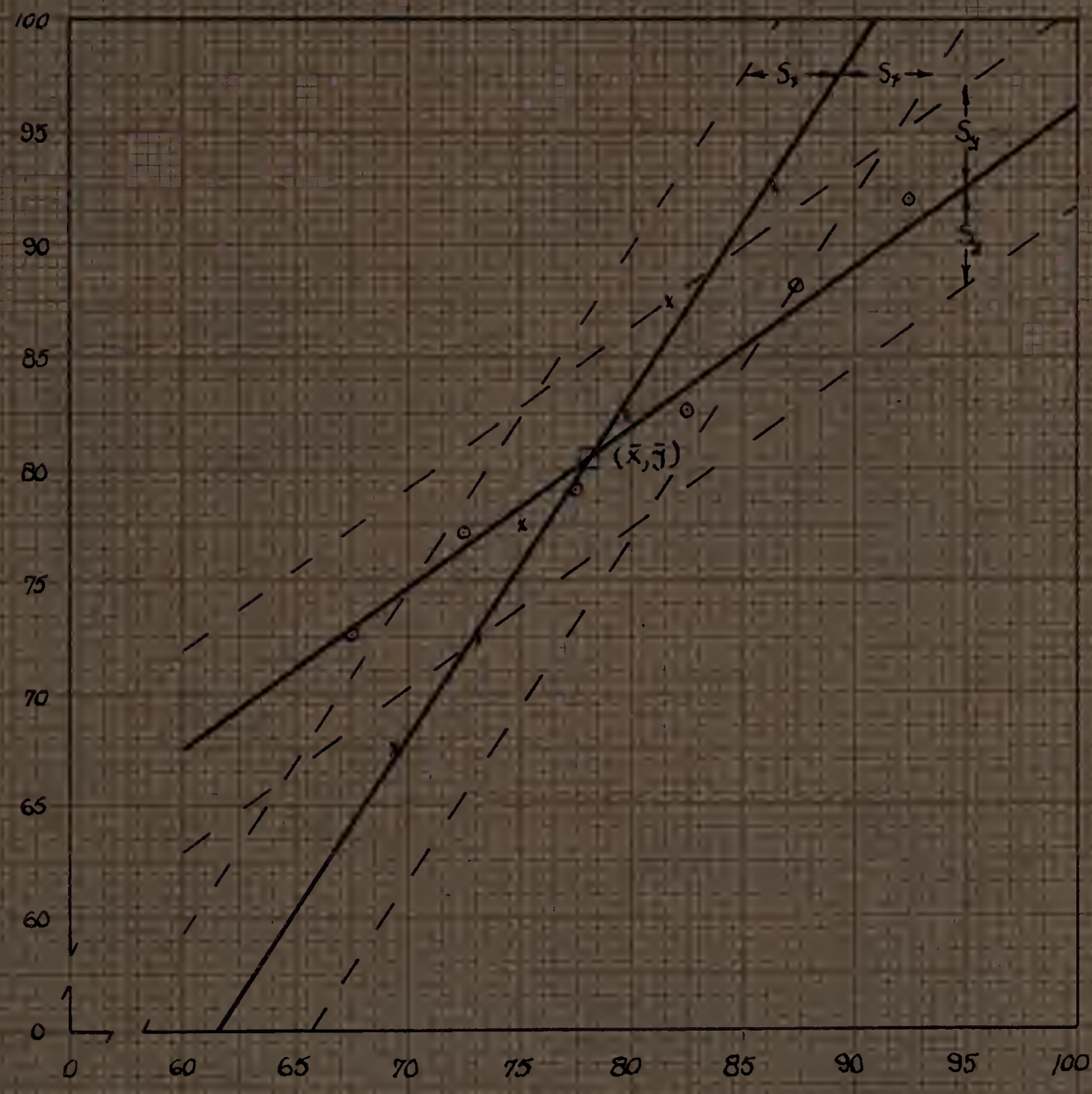
(1) Kenny, J.F. Mathematics of Statistics - Part I. pp. 180-183.

(2) Ibid. pp. 199-202.

CHAPTER VI

Lines of Regression for the Average 4 yr. Grade and the Average Grade in Major



$\bar{x} = 78.26$ $\quad \sigma_x = 5.845$ $\quad m_1 = r\frac{\sigma_y}{\sigma_x} = .72$ $\quad S_x = 4.43$

$\bar{y} = 80.67$ $\quad \sigma_y = 6.130$ $\quad m_2 = r\frac{\sigma_x}{\sigma_y} = .66$ $\quad S_y = 4.27$

$r = .69$

Line of Regression y on x: $\quad \bar{y}_x - 80.67 = .72(x - 78.26)$

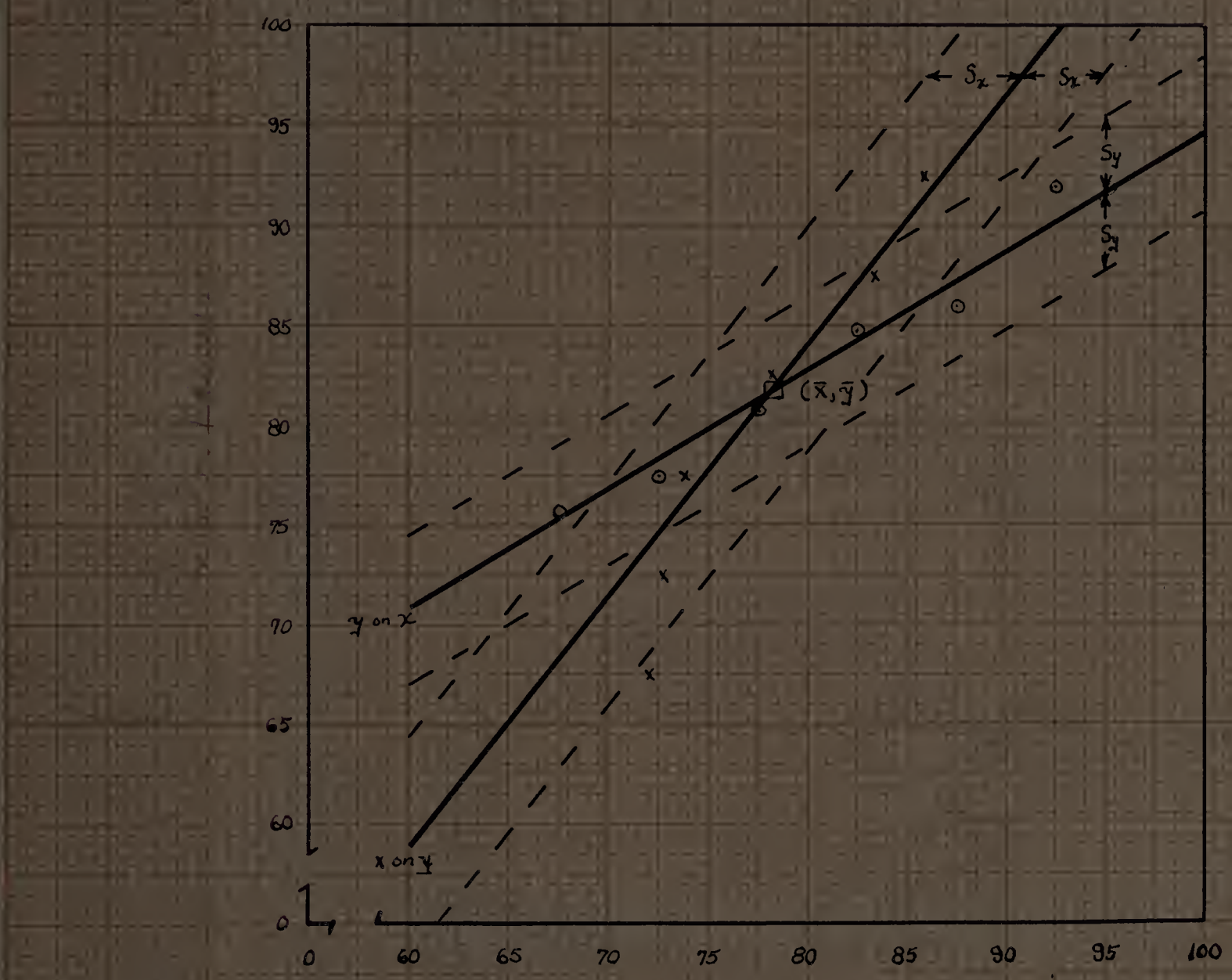
or $\quad \bar{y}_x = .72x + 24.32$

Line of Regression x on y: $\quad \bar{x}_y - 78.26 = .66(y - 80.67)$

or $\quad \bar{x}_y = .66y + 25.02$

CHART VII

Lines of Regression for the Average 4 yr. Grade and the Average Grade in Education



$\bar{x} = 78.26$ $\quad \sigma_x = 5.845$ $\quad m_1 = r\frac{\sigma_y}{\sigma_x} = .60$ $\quad S_x = 4.29$

$\bar{y} = 81.72$ $\quad \sigma_y = 5.150$ $\quad m_2 = r\frac{\sigma_x}{\sigma_y} = .77$ $\quad S_y = 3.78$

$r = .68$

Line of Regression y on x: $\quad \bar{y}_x - 81.72 = .60(x - 78.26)$

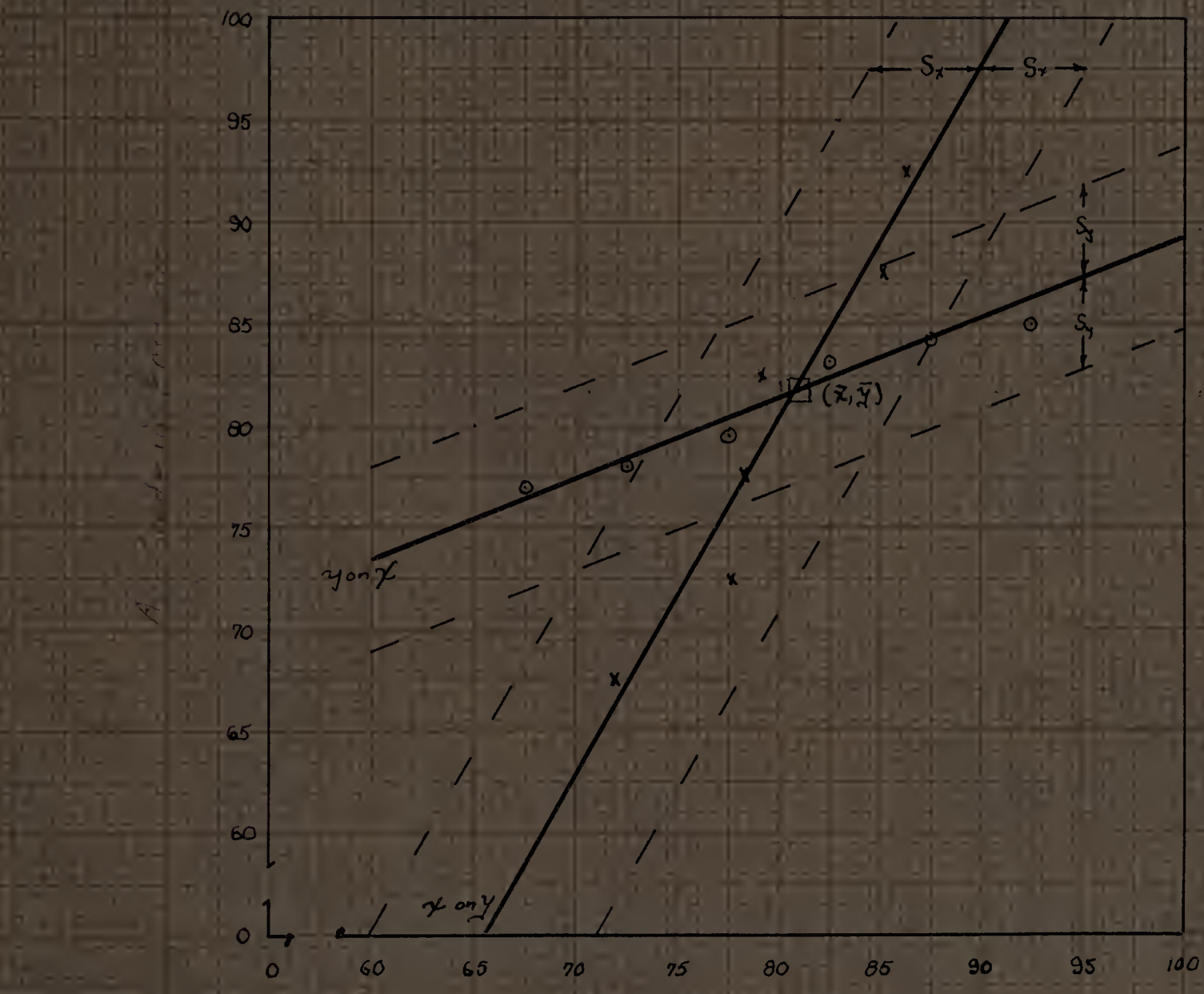
or $\quad \bar{y}_x = .60x + 34.76$

Line of Regression x on y: $\quad \bar{x}_y - 78.26 = .77(y - 81.72)$

or $\quad \bar{x}_y = .77y + 15.34$

CHART VIII

Lines of Regression for the Average Grade in Major and the Average Grade in Education



$\bar{x} = 80.67$ $\quad \sigma_x = 6.130$ $\quad m_1 = r\frac{\sigma_y}{\sigma_x} = .40$ $\quad S_x = 5.38$

$\bar{y} = 81.72$ $\quad \sigma_y = 5.15$ $\quad m_2 = r\frac{\sigma_x}{\sigma_y} = .57$ $\quad S_y = 4.50$

$r = .48$

Line of Regression y on x: $\quad \bar{y}_x - 81.72 = .40(x - 80.67)$

or $\quad \bar{y}_x = .40x + 49.45$

Line of Regression x on y: $\quad \bar{x}_y - 80.67 = .57(y - 81.72)$

or $\quad \bar{x}_y = .57y + 34.09$

age y for a particular value of x; similarly, the regression line of x on y estimates the average x for a particular value of y.[3] In order to facilitate prediction in both directions from one chart, both regression lines have been shown wherever possible. Chart VI gives the lines of regression for the Average 4 yr. Grade and the Average Grade in Major; Chart VII, for the Average 4 yr. Grade and the Average Grade in Education; and Chart VIII, for the Average Grade in Major and the Average Grade in Education. Table IX is a summary of Charts VI, VII, and VIII.

Correlation of Ranks in Entrance Examination and Ranks in Graduating Class -- In Chapter III, a comparison of the distributions of the Ranks on the Entrance Examination and the Ranks in the Graduating Class was presented. The coefficient of correlation determined for these two distributions is .49; the standard error of estimate, .261. The Correlation Table may be found in Appendix VI. Chart IX gives a graphical representation of the line of regression of y on x, whose equation is $\overline{y}_x = .51x + .244$. Since the regression line of x on y would have no practical value in this case, it has been omitted from Chart IX.

It is to be noted that $\pm S_y$ represents .522 units or slightly more than one-half the entire range of ranks. Thus, it is apparent that the use of this regression

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(3) Op. cit. p.202.

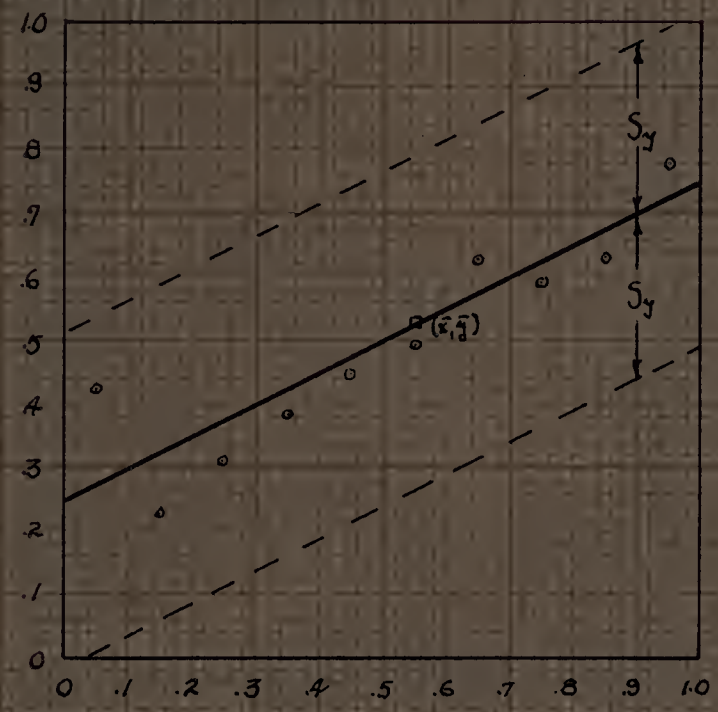
TABLE IX

Summary of the Equations of the Lines of Regression, the Standard Errors of Estimate, and the Coefficients of Correlation for Charts VI, VII, & VIII.

Distribution Combination	Equations of Lines of Regression	Standard Error of Estimate	Coef. of Correlation
Average 4 yr. Grade and Average Grade in Major	y on x: $\bar{y}_x = .72 \not + 24.32$	$S_y = 4.43$	.69
	x on y: $\bar{x}_y = .66y \not + 25.02$	$S_x = 4.27$	
Average 4 yr. Grade and Average Grade in Education	y on x: $\bar{y}_x = .60x \not + 34.76$	$S_y = 3.78$	.68
	x on y: $\bar{x}_y = .77y \not + 15.34$	$S_x = 4.29$	
Average Grade in Major and Average Grade in Education	y on x: $\bar{y}_x = .40x \not + 49.45$	$S_y = 4.50$	.48
	x on y: $\bar{x}_y = .57y \not + 34.09$	$S_x = 5.38$	

CHART IX

Line of Regression for Ranks in Entrance Examination and Ranks in Graduating Class



$\bar{x} = .550$ $\quad \sigma_x = .288$ $\quad r = .49$

$\bar{y} = .524$ $\quad \sigma_y = .301$ $\quad m_1 = r\frac{\sigma_y}{\sigma_x} = .51$

Equation of the Line of Regression of y on x is

$$\bar{y}_x - .524 = .51(x - .550)$$

or $$\bar{y}_x = .51x + .244$$

Standard Error of Estimate $= S_y = \sigma_y (1 - r^2)^{1/2}$

$$S_y = .261$$

equation for prediction is unwarranted. The irregular nature of the distribution of ranks, the large standard error of estimate, and the low coefficient of correlation tend to indicate that the sampling of ranks obtained in this study is not representative of the entire universe of ranks. A larger sample would undoubtedly prove to be more satisfactory.

Summary of Chapter -- From Table VIII and Chart V, it was found that a comparison of the distributions of the various average grades revealed that all were normal in character and that the distribution of the Average Grade in Education possessed the highest mean and the lowest measures of dispersion. It will be remembered that when these distributions were discussed separately it was found that a more selective program of choosing candidates should be considered.

Only a moderate degree of association is indicated by the coefficients of correlation that have been determined in this chapter. However, use of the standard error of estimate permits the use of the correlation coefficients and the lines of regression for prediction to a certain degree.

From Charts VI, VII, and VIII, it is apparent that the Average 4 yr. Grade is the best basis for predicting grades in Education and in the Major Fields. In regard to Chart IX, it was found that the use of the regression equation to estimate position in the Graduating Class from the Ranks on

the Entrance Examination is unwarranted. All evidence points to the fact that the sample of ranks used in the study is not a representative one.

CHAPTER VII

ACTIVITIES

CHAPTER VII

ACTIVITIES

When the limitations of this study were discussed in Chapter II, it was emphasized that quantitative college records offer but little information in regard to personality traits and special abilities deemed desirable in teachers. However, since some of the more important college activities are listed on the records, we may at least obtain an indication of the social, scholastic, and athletic interests of the teacher trainees as well as some evidence of leadership, administrative ability, and special talents. These shall be discussed below.

Scholastic Ability -- It is significant that 22 of the 139 trainees, or 16%, were elected to Phi Kappa Phi, the national honorary scholastic society. In this regard, an average grade of 85.0 or greater for 3 consecutive years is the primary requisite for election.

Expression of Special Talents -- A total of 23 records showed evidence of special dramatic, oratorical, literary, or musical ability.

Evidence of Leadership -- 59 records, or 42%, showed evidence of leadership. In this category were included such positions as officers of organizations, clubs, fraternities and sororities, chairmen of the various student committies, and members of the student government.

Administrative Ability -- The records also show that 61 individuals demonstrated administrative ability by ser-

ving on important student and student-faculty committees and by managorial or executive duties on the college newspaper, the radio station staff, the yearbook, and the freshman handbook. Table X below gives a frequency distribution of Administrative Activity.

TABLE X

Frequency Distribution of Administrative Activity

Number of Activities	Frequency	Cumulative Frequency	Cumulative Frequency %
more than 4	4	4	3
4	1	5	4
3	7	12	9
2	20	32	23
1	29	61	44

From Table X it is to be noted that 44% of the trainees had engaged in at least one important administrative activity during their college careers.

Social Activities -- It was also interesting to find that 31 trainees or 22% were fraternity members, 55 or 40% were sorority members, and 53 or 38% were non-members. The ratio of members to non-members was approximately 1.6 to 1.

In regard to clubs, it was found that 90% of the trainees were active members of at least one student club.

Table XI below represents the frequency distribution of club membership.

TABLE XI

Frequency Distribution of Club Membership

Number of Clubs	Frequency	Cumulative Frequency	Cumulative Frequency %
more than 5	17	17	12
5	9	26	19
4	20	46	33
3	28	74	55
2	29	103	74
1	22	125	90

Summary of Chapter -- It was found that 16% of the trainees had earned membership to Phi Kappa Phi, the national honorary scholastic society. 42% showed evidence of leadership, while an equal number exhibited administrative ability. Furthermore, 23 trainees showed evidence of special dramatic, oratorical, literary, or musical ability. It was also found that the ratio of fraternity and sorority members to non-members was 1.6 to 1 and that nearly all trainees held membership in at least one student club.

CHAPTER VIII

CONCLUSIONS AND GENERALIZATIONS

CHAPTER VIII

CONCLUSIONS AND GENERALIZATIONS

In summation, the following findings and generalizations based upon this study are presented below:

1. Ratio of Men to Women -- The ratio of men to women for the individuals concerned in the study was 1.0 to 2.3 as compared with 1.0 to 1.4 for secondary school teachers on a national scale. The ratio for the trainees was partially influenced by the decrease in the enrolment of men during the war years; nevertheless, the need to recruit more men teachers is indicated.

2. Source of Teacher Trainees -- 47.4% of the trainees came from cities; 38.0% from towns of more than 5,000 population; and 14.6%, from towns of less than 5,000 population. Furthermore, it was found that since most trainees will receive their first appointments in small towns and since 85% of them originate in cities or large towns, the training program should familiarize trainees with conditions in rural communities and with operating procedures in the small school.

3. Distribution of Trainees by Classes -- It was found that this distribution was influenced by World War II. A sharp increase in the number of candidates resulted in the years 1947-48. In anticipation that this increase represents the beginning of a trend, the University should be prepared to take full advantage of the opportunity to put into effect a more critical system of selection and to

establish higher standards and a more rigid system of elimination during the training period.

4. Ranks on Entrance Examination and Ranks in Graduating Class -- These two distributions were irregular and abnormal in character. The coefficient of correlation was only .49 and the standard error of estimate was very large. This evidence indicates that the ranks utilized in the study were not representative of the entire universe of ranks. Therefore, use of the estimating equation for predicting position in the Graduating Class is unwarranted.

5. The Average 4 yr. Grade -- The distribution of the Average 4 yr. Grade was normal; the mean being 78.26, the standard deviation, 5.845.

6. Ratio of Liberal Arts to Science Majors -- This ratio was found to be 2.6 to 1.0. English and History were the predominant specializations with respect to the Liberal Arts; Mathematics, with respect to the Sciences.

7. The Average Grade in Major -- The distribution of the Average Grade in Major was normal. The mean was 80.67; the standard deviation, 6.130.

8. Amount of Training in Education -- Approximately 42% of the trainees had pursued 5 or more courses in professional education. The median number of courses was 4.7.

9. Amount of Training in Education prior to Practice Teaching -- The average number of Education courses pursued

before Practice Teaching was 2; the median, 2.5. 68% of the trainees had taken 2 or more courses prior to their Practice Teaching.

10. Type of Training in Education -- In order of highest frequency, Methods, Principles of Secondary Education, History of Education, Curriculum, and Tests and Measurement were the courses most frequently pursued.

11. Average Grade in Education -- The distribution of the Average Grade in Education was also normal; the mean was 81.72 and the standard deviation, 5.150.

12. Comparison of Frequency Distributions -- From Table VIII it was found that the distribution of the Average Grade in Education compared with the distributions of the Average 4 yr. Grade and the Average Grade in Major possessed the highest mean and the lowest measures of dispersion. All three distributions indicated that the group of trainees concerned in this study represent a random or representative group of college students. It is apparent that the Department of Education at the University should be more discriminating in choosing candidates and should require a higher standard of performance during the training process.

13. Coefficients of Correlation -- A moderate degree of correlation existed between the factors studied; for the Average 4 yr. Grade and the Average Grade in Major, .69; for the Average 4 yr. Grade and the Average Grade in Education, .68; for the Average Grade in Major and the Average

Grade in Education, .48; for the Rank in Entrance Examination and the Rank in Graduating Class, .49.

14. Lines of Regression -- It was found from Charts VI, VII, and VIII that the Average 4 yr. Grade is the best basis for predicting grades in Education and in the Major Fields, ie., Charts VI and VII are more reliable than Chart VIII.

15. Activities -- It was found that 62% of the trainees were members of Fraternities or Sororities. 90% were active members of at least one student club. 16% had distinguished themselves by exceptional scholastic records and an equal number exhibited special abilities and talents. Furthermore, 42% demonstrated qualities of leadership and 44% indicated administrative ability.

General Summary -- In general terms, the findings of this study show that the teacher trainees at the University of Massachusetts receive an adequate amount of proper training in Professional Education and in the Major Fields; in this respect, they compare favorably with trainees from institutions of the other states. However, the study has brought forth considerable evidence indicating that the Department of Education at the University should employ more discriminative measures in its selection of candidates. Furthermore, it was also shown that the establishment of stricter standards of performance during the training pro-

cess should follow up this more critical system of selection. Thru these improvements, a larger percent of superior teachers will be produced annually.

In regard to recruiting of future candidates, it was found that an effort should be made to recruit more men teachers into the profession. Furthermore, since the majority of future candidates will originate in urban communities and will receive their first positions in small towns, it becomes evident that some provision for adjustment to conditions in the small town and to operating procedure in the small school will be necessary in the training period.

In the final analysis, it is apparent that the findings of this study can materially aid the Department of Education at the University to further its recruiting program for future teaching personnel, to maintain a high standard of performance during the training process, and to enable a more concrete evaluation of the end products. It is recommended that the Department of Education incorporate these findings in its operational plans.

APPENDICES

Data Collection Form -- Front Side

Data Collection Form -- Reverse Side

Correlation Table for the Average 4 yr. Grade and the Average Grade in Major

Correlation Table for the Average 4 yr. Grade and the Average Grade in Education

Correlation Table for the Average Grade in Major and the Average Grade in Education

Correlation Table for the Rank in Entrance Examination and the Rank in Graduating Class

APPENDIX K

DATA COLLECTION FORM -- FRONT SIDE

Name Major H.S.Attended Rank Ent. Exam.

Class Position in graduating class Average Grade (4 yr.)

Average Grades: Fr. S. J. Sr.

1st Semester

2nd Semester

Yearly

No. of Courses in Major: Average Grade in Major:

No. of Courses in Education: Average Grade in Education:

	Education Courses	Grade
1.		
2.		
3.		
4.		
5.		
6.		

*Courses taken before Practice Teaching.

Comments:

Activities

Frat. Sor. Non-member

Clubs

Leadership

Athletics

APPENDIX II

DATA COLLECTION FORM -- REVERSE SIDE

APPENDIX III

Correlation Table for the Average 4 yr. Grade and the Average Grade in Major

Average 4 yr. Grade

Average Grade in Major

	u	-2	-1	0	1	2	3		f(v)	v f(v)	v² f(v)	U	v U	$\bar{X}_y$
v	y \ x	67	72	77	82	87	92							
2	92			1	1	6	2		10	20	40	19	38	86.5
1	87		5	4	8	13			30	30	30	29	29	81.8
0	82		3	13	22	1			39	0	0	21	0	79.7
-1	77	3	11	19	4				37	-37	37	-13	13	75.2
-2	72	4	8	6	1				19	-38	76	-15	30	73.1
-3	67	2	2						4	-12	36	-6	18	69.5
f(u)		9	29	43	36	20	2		139	-37	219		128	
u f(u)		-18	-29	0	36	40	6		35					
u² f(u)		36	29	0	36	80	18		199					
V		-17	-28	-25	4	25	4							
u V		34	28	0	4	50	12		128					
$\bar{y}_x$		72.6	77.2	79.1	82.6	88.3	92.0							

check

$\bar{u} = .252$ $\quad \sigma u = 1.169$

$\bar{v} = -.266$ $\quad \sigma v = 1.226$

$$r = \frac{1/N \Sigma vU - \bar{u}\bar{v}}{\sigma u \, \sigma v}$$

$r = .69$

APPENDIX IV

Correlation Table for the Average 4 yr. Grade and the Average Grade in Education

Average 4 yr. Grade

	u	-2	-1	0	1	2	3		f(v)	vf(v)	$v^2f(v)$	U	vU	$\bar{X}_y$
v	x / y	67	72	77	82	87	92							
2	92				4	2	2		8	16	32	14	28	85.8
1	87		1	3	15	14			33	33	33	42	42	83.4
0	82	1	7	27	14	3			52	0	0	11	0	78.1
-1	77	5	17	12	3				37	-37	37	-24	24	73.8
-2	72	3	2	1		1			7	-14	28	-6	12	72.7
-3	67		2						2	-6	18	-2	6	72.0
f(u)		9	29	43	36	20	2		139	-8	148		112	
uf(u)		-18	-29	0	36	40	6		35					
$u^2f(u)$		36	29	0	36	80	18		199					
V		-11	-26	-11	20	16	4							
uV		22	26	0	20	32	12		112					
$\bar{y}_x$		75.9	77.5	80.7	84.8	86.0	92.0							

Average Grade in Education

check

$\bar{u} = .252$ $\sigma u = 1.169$

$\bar{v} = -.057$ $\sigma v = 1.030$

$$r = \frac{1/N \sum vU - \overline{uv}}{\sigma u \, \sigma v}$$

$r = .68$

APPENDIX V

Correlation Table for the Average Grade in Major and the Average Grade in Education

Average Grade in Major

Average Grade in Education

	u	-3	-2	-1	0	1	2		f(v)	vf(v)	v²f(v)	U	vU	$\bar{X}_y$
v	y \ x	67	72	77	82	87	92							
2	92				3	3	2		8	16	32	7	14	86.4
1	87		1	2	10	15	5		33	33	33	21	21	85.2
0	82	2	6	18	19	6	1		52	0	0	-18	0	79.3
-1	77	1	8	15	7	5	1		37	-37	37	-27	27	78.4
-2	72		4	1		1	1		7	-14	28	-6	12	77.7
-3	67	1		1					2	-6	18	-4	12	72.0
f(u)		4	19	37	39	30	10		139	-8	148		86	
uf(u)		-12	-38	-37	0	30	20		-37					
u²f(u)		36	76	37	0	30	40		219					
V		-4	-15	-18	9	14	6							
uV		12	30	18	0	14	12		86					
$\bar{y}_x$		77.0	78.1	79.6	83.2	84.3	85.0							

check

$\bar{u} = -.266$ $\quad \sigma u = 1.266$

$\bar{v} = -.057$ $\quad \sigma v = 1.030$

$$r = \frac{1/n \sum vU - \bar{u}\bar{v}}{\sigma u \, \sigma v}$$

$r = .48$

APPENDIX VI

Correlation Table for the Rank in Entrance Examination and the Rank in Graduating Class

Rank in Entrance Examination

	u	-5	-4	-3	-2	-1	0	1	2	3	4						
Rank in Graduating Class: v	y \ x	.050	.150	.250	.350	.450	.550	.650	.750	.850	.950	f(v)	vf(v)	$v^2f(v)$	U	vU	$\bar{X}_y$
4	.950					1	1	3	2	2	9	18	72	288	48	192	.817
3	.850	2	1				1	2		2	2	10	30	90	2	6	.570
2	.750			1		1	1	4	3	3	2	15	30	60	23	46	.703
1	.650				2	3		3	1	2		11	11	11	4	4	.586
0	.550	1	1	1	1		1	1	3		1	10	0	0	-3	0	.520
-1	.450		3	1	1	3		1	1	1	1	12	-12	12	-10	10	.467
-2	.350		1	2	1	2		1		3	1	11	-22	44	0	0	.555
-3	.250	2	3	1		1	1	1		1		10	-30	90	-22	66	.330
-4	.150	1	2		2	2		1	1		1	10	-40	160	-12	48	.430
-6	.050	1	4	2	2	1	2	1	1			14	-70	350	-29	145	.343
f(u)		7	15	9	8	14	7	18	12	14	17	121	-31	1105		517	
u f(u)		-35	-60	-27	-16	-14	0	18	24	42	68	0					
$u^2f(u)$		175	240	81	32	14	0	18	48	126	272	1006					
V		-9	-39	-16	-19	-14	-4	14	5	12	39						
uV		45	156	48	38	14	0	14	10	36	106	517					
$\bar{Y}_x$		.421	.223	.311	.381	.450	.493	.628	.592	.636	.780						

Check

$\bar{u} = .000$ $\quad \sigma u = 3.011$

$\bar{v} = .256$ $\quad \sigma v = 2.880$

$$r = \frac{1/N \Sigma vU - \overline{uv}}{\sigma u \, \sigma v}$$

$r = .49$

BIBLIOGRAPHY

BIBLIOGRAPHY

Bent, R.K. and Kronenberg, H.H. Principles of Secondary Education. New York: McGraw-Hill Book Company Inc., 1941. pp. xiii + 594.

Duggan, Stephen History of Education. New York: D. Appleton-Century Company, 1936. pp. xxiv + 486.

Frazier, B.W. Summary of Teacher Certification Requirements 1947-48. Washington: Federal Security Agency, Circular no. 233. (February, 1948) pp. 9.

Kenny, J.F. Mathematics of Statistics - Part I. New York: D. Van Nostrand Company Inc., 1947. pp. xii + 260.

Reeder, W.G. The Fundamentals of Public School Administration. New York: The Macmillian Company, 1941. pp. xv + 798.

Salaries of Teachers in the Public Schools of Massachusetts. Mass. Dept. of Education Bull. 1936. whole no. 96, no. 5. pp. 52.

"Teachers in the Public Schools." N.E.A. Research Bull. XXVII, no. 4, (December, 1949) pp. 126-160.

Additional Statistical References

Croxton, F.E. and Cowden, D.J. Applied General Statistics. New York: Prentice-Hall Inc., 1939. pp. xv + 944.

Ross, C.C. Measurement in Today's Schools. New York: Prentice-Hall Inc., 1941. pp. xviii + 578.

Problem approved by: William M. Rourke

Albert W. Purvis

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