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THE DEMAND AND SUPPLY OF TRAINED TEACHERS IN  
PUBLIC SCHOOLS OF MINNESOTA

A THESIS SUBMITTED TO THE  
FACULTY OF THE GRADUATE SCHOOL OF THE  
UNIVERSITY OF MINNESOTA

BY

R. B. MacLean

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CONTENTS

<u>Chapter</u>	<u>Page</u>
Introduction: Education a Function of the State . . . . .	6
PART I: THE DEMAND FOR TRAINED TEACHERS:	
I. The Demand in General . . . . .	9
II. The Aggregate Demand . . . . .	15
III. The Annual Demand . . . . .	26
IV. Forecast of Future Aggregate and Annual Demands . . . . .	39
PART II: THE SUPPLY OF TRAINED TEACHERS:	
V. The Supply in General . . . . .	51
VI. The Adequacy of the Supply Judged by the Training of Teachers Now in the Service . . . . .	58
VII. The Adequacy of the Supply Judged by the Numbers Trained in Professional Institutions . . . . .	66
VIII. Summary and Conclusions . . . . .	70
Appendix . . . . .	72
Bibliography . . . . .	75

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STATISTICAL TABLES

<u>Table</u>	<u>Page</u>
I. Aggregate Demand for Rural Teachers in the Schools of Minnesota . . . . .	16
II. Enrollment of Pupils in Rural Schools by Grades . . . . .	17
III. Aggregate Demand for Elementary Teachers in the Graded and High Schools of Minnesota . . . . .	18
IV. Aggregate Demand for Elementary Teachers Year 1920 Analyzed on Basis of Need for Each Grade . . . . .	19
V. Aggregate Demand for Secondary Teachers in the Graded and High Schools of Minnesota . . . . .	21
VI. Enrollment of Pupils in High School Subjects, Statistics for 1919-1920 . . . . .	22
VII. Enrollment of Pupils in High School Subject-Groups for 1919-1920 . . . . .	25
VIII. The Annual Demand for Rural Teachers Based on Statistics for Year 1920-1921 . . . . .	27
IX. The Annual Demand for Rural Teachers for Years 1910 to 1921 . .	30
X. The Annual Demand for Elementary Teachers Years 1910 to 1920 .	36
XI. The Annual Demand for Secondary Teachers Years 1910 to 1920 . .	37
XII. Population of Minnesota 1850 to 1920 . . . . .	40
XIII. Future Demands in Rural Schools . . . . .	45
XIV. Future Demands in Elementary Schools . . . . .	47
XV. Forecast of Enrollment of Secondary Pupils and Number of Teachers Required for Secondary Schools . . . . .	50
XVI. Future Demands in Secondary Schools . . . . .	50
XVII. Annual Supply of Trained Teachers Needed to Meet the Demands for Years 1920 to 1925 . . . . .	57
XVIII. Professional Qualifications of Minnesota Rural School Teachers 1920-1921 As Shown By Type of Certificate Held . .	60
XIX. Professional Qualifications of Minnesota Elementary Teachers As Shown By Training . . . . .	63

Table

Page

XX.	Professional Qualifications of Minnesota Secondary Teachers As Shown By Training . . . . .	64
XXI.	Annual Supply of Trained Teachers . . . . .	67
XXII.	Relation of Annual Supply to Annual Demand in Rural, Elementary and Secondary Schools of Minnesota . . . . .	69

DIAGRAMS

<u>No.</u>		<u>Page</u>
1.	Plotted and Projected Curve Showing Number of Rural Teachers Years 1910 to 1925 . . . . .	44
2.	Plotted and Projected Curve Showing Number of Secondary Pupils Enrolled in Public Schools 1910 to 1925 . . . . .	49

## INTRODUCTION

The revelations of the war have directed attention to public problems and prompted many investigations. They have called attention to the function of the public schools and the need of the state to safeguard democracy by control of the supply of teachers.

Prior to the war little attention was given to the question of demand for teachers in Minnesota or the extent to which the state was meeting this demand with a supply of trained workers. It is true that Minnesota, like other states in the Union had recognized a responsibility resting upon the state to train teachers. To meet this obligation there were established normal schools, a college of education at the university and the teacher-training departments in state high schools. There was, however, little public concern, little accurate or scientific data relating to the need for teachers or the degree to which state institutions were supplying the demand. So long as school boards were able to employ teachers at established salaries, it was a matter of little concern whether the state was training enough teachers to supply her own schools or whether the supply came from other states or from private institutions.

This apathy toward the training of teachers was changed by the war. The young men engaged in teaching, entered their country's service. Many women left the active work of the school room; some to take up forms of patriotic service; others to enter the industries and commercial world attracted by salaries which seemed high compared with the teacher's pay. A teacher shortage resulted, which closed many schools and departments and threatened to



seriously impair the general efficiency of the school system. Teachers' salaries increased rapidly, taxes multiplied. The public was aroused. The teacher supply has become an issue not only in Minnesota; it is a national question.

It is the purpose of this study to examine critically the demand and supply of trained teachers in the public schools of the state of Minnesota. First, the teacher needs in relation to different classes of schools and different grades within a school system will be considered. This need will measure the demand. Second, the source of trained teachers will be investigated. This phase of the study will be concerned with the supply. The problem will be studied from the standpoint of the public schools, no account being taken of the call for teachers in private or parochial schools. The professional schools maintained and controlled by the state will be considered as the source of supply of trained teachers. In so far as private schools and schools located in other states are a source of supply, recognition will be given to their product.

The problem of demand and supply of teachers is an administrative one; it will be treated by statistical methods. The study does not lend itself to experimentation. In a limited degree it is approached historically. The data are drawn from documentary and original sources. Statistics have been taken from the following printed reports: 1. Federal census reports; 2. Biennial reports of the Minnesota state department of education; 3. Annual reports of the state graded school inspector; 4. Annual reports of the state high school inspector. Original reports submitted by local school authorities to the state department of education have also been consulted. The questionnaire has been used in getting information from county superintendents of schools and also in getting facts from the heads of teacher-training institu-

tions concerning the supply of teachers being graduated.

This study has been undertaken to answer specifically the following questions:

1. What is the total number of teachers employed in the schools of different classes in the state?
2. What is the average length of service of teachers in the several classes of schools?
3. Based on length of service, how many teachers drop out of the schools each year?
4. What are the factors which tend to cause an increase or decrease in the number of teachers?
5. How many teachers are required annually to provide for replacement and growth in the schools?
6. To what extent have the schools of the state been supplied with qualified teachers?
7. To what degree are the state institutions for the training of teachers furnishing a supply adequate to the needs?

## PART I.

THE DEMAND FOR TRAINED TEACHERS

- - -

## CHAPTER I.

## THE DEMAND IN GENERAL

The demand for teachers is the expression of a social need. This demand is a measurable quantity. It varies little from year to year. There are several factors which make for stability and constancy in the demand.

1. The public schools of Minnesota as well as those of other states are supported by a well defined and intelligent public sentiment. Universal and free education is recognized as essential in the training of citizens and voters.

2. The school as an instrument of society has become a civil institution. Its organization is provided in law and its support is through legalized taxation.

3. Immense sums of public money have been spent in the erection of school buildings and the purchase of school equipment.

It may be assumed then, that the demand for teachers will continue according to present social needs. This means that the demand for teachers in Minnesota for the year 1920-21 will offer a basis for an estimate of teachers needed in the year 1921-22. The statistics concerning teachers employed for a series of

1. Hollister, Horace A. The administration of education in a democracy. Chapter II, National ideals and standards pp 12 to 23.
2. Cubberley, E. P. Public education in the United States, p 487. Houghton Mifflin Co., Boston 1919.
3. The value of all public property used for school purposes in Minnesota in 1918 was 63 million dollars. See statistics of state school systems 1917-18; Bulletin No. 11, 1920 Dept. of Interior, Bureau of Education, Washington, D.C. Table 41, p 117.

years in the state will furnish reliable data upon which to compute the probable number required for the future.

It must not be inferred that the needs do not change. An increase in the school population of a district or state adds to the needs and increases the demand. The demand reflects also changing public sentiment. The demand changes with the introduction or elimination of courses and activities; with the establishment of new requirements in regard to size of classes or length of recitation periods; with the discovery of sources of revenue not previously available for schools. It is then, necessary to study tendencies in the changing needs and the varying demands for teachers, if one would attempt to analyze the present situation or conjecture the future needs. The demand for teachers may be studied quantitatively or qualitatively.

The demand studied quantitatively has to do solely with the number of teachers required to fill the different positions. It is evident that in counting teachers we measure service rendered. A unit of service must be selected. With the universal practice of employing teachers for the school year, it will be convenient to measure demand in number of teachers rendering service for the period of a single school year. A survey of the schools of Minnesota during the winter, say in the month of February finds thousands of teachers at work. Some teachers are employed in one room rural schools, some in the villages and others in the cities. All of these teachers taken together represent the sum total of the local demands for teachers. The total number of teachers employed in the state may be said to represent the aggregate demand. In case the study extends over a series of years, the sum of the aggregate demands will be designated the total aggregate demand. It should be pointed out that total aggregate demand is a term used to measure service in terms of teachers and years of service. It does not indicate the number

of different individuals employed in the system during the time under consideration. To illustrate, the city of Duluth reported 388 teachers in 1917,<sup>4</sup> 491 teachers in 1918,<sup>5</sup> and 562 teachers in 1919.<sup>6</sup> The total aggregate demand for the three years was 1441 teachers but the actual number of teachers, (different individuals) was a number not less than 562 nor more than 1441. The term total aggregate demand as here defined is not employed in the statistics of this thesis. It is defined to make clear the term aggregate demand which is frequently used.

With the close of school each year many teachers drop out of the work or leave the state. New teachers must be secured to carry on the work. This need may be called the annual demand, or since this is the vital and urgent need, it may be called the demand. It is evident that the annual demand will be a fractional part of the aggregate demand. As a statistical problem, the annual demand may be determined in two ways:

1. The teachers entering the work may be counted. In any year the newly appointed teachers would constitute the annual demand. The distribution of the newly appointed teachers among different classes of schools and different groups of educational activities, would show the annual demand in each class of school and activity.

2. On the other hand, the outgoing teachers may be considered. In a system where the aggregate demand remains constant from year to year, the replacement number will be equal to the number who drop out. Where the

4. Annual Report of the Inspector of State High Schools, State of Minnesota, for the School Year Ending July 31, 1917, Table IV.

5. Ibid, Report for 1918, Table V.

6. Ibid, Report for 1919, Table V.

aggregate demand is increasing, the annual demand will equal the replacement number plus an increment number. The term increment<sup>7</sup> is used to designate the number needed annually to provide for growth and expansion. The number of teachers who drop out of service in any system equals the aggregate demand divided by the average or mean length of service expressed in years. These principles may be represented mathematically by symbols and formulae:

If . . . . D = Aggregate demand

d = Annual demand

r = Annual replacement

i = Increment or decrement

a = Average service in years

Then (1).  $d = r/i$

(2)  $r = \frac{D}{a}$

The terms defined and the principles stated may be simply illustrated. The diagram following shows the teacher situation in a small system of six teachers, extending over a period of five years. The broken lines are used to represent the length of service of teachers in each of the six positions:

Position	Years				
	1	2	3	4	5
1	---	---	---	---	---
2	---	---	---	---	---
3	---	---	---	---	---
4	---	---	---	---	---
5	---	---	---	---	---
6	---	---	---	---	---

7. Where the aggregate demand is decreasing from year to year, the annual demand will equal the number who drop out minus a decrement. The annual demand is equal to the replacement number plus or minus the quantity which represents the change in the aggregate demand. This quantity then is positive or negative. It is positive in a growing, expanding system and negative in a decreasing or declining system.

The distribution of these teachers according to length of service is as follows:

Number of teachers. Frequency (f)	Years of Service. Measure (m)	f x m	
7	1	7	
4	2	8	Average 2 years
2	3	6	Median $1\frac{1}{4}$ "
1	4	4	
<u>1</u>	<u>5</u>	<u>5</u>	
Total 15		30	

The aggregate demand for the first year is 6 and remains the same for each succeeding year. The total aggregate demand for the five years is 30. The number of teachers employed during the five years is 15 with an average service of 2 years. It may be pointed out that median of service is  $1\frac{1}{4}$  years. The median is interesting in a study of the problems of supervision but it can not be used mathematically in computing the demand.

For the purposes of this study, the demand is analyzed for three types of schools or fields of teaching:

1. Rural schools.<sup>8</sup> These schools are for the most part one-teacher schools organized in the common districts<sup>9</sup> of the state. In 1919-20 there were 8650 rural teachers; of these 8148 were employed in one-room schools, and 502 in schools of two or more departments,<sup>10</sup> (approximately one-half of the teachers of the state are employed in the rural schools.<sup>11</sup>)

8. General Statutes of Minnesota 1913, Section 2801.

9. Ibid, Section 2671.

10. Educational Directory of Minnesota, Department of Education 1920-21. Summary of school statistics p 3.

11. Ibid, p 3.

2. Elementary schools. This term is used to refer to the organization of grades one to eight inclusive in schools classified as state graded schools<sup>12</sup> or state high schools.<sup>13</sup> More than one-third of the teachers of the state can be classed as elementary teachers.<sup>14</sup>

3. Secondary schools. This field has been limited for the present purpose to four years of work comprising the ninth, tenth, eleventh and twelfth grades. This includes the upper four grades in a state high school system and the high school department in a state graded school. Only such teachers have been counted in this field as meet the state's standards for recognized high school work. The teachers in this group comprise about one-sixth the teaching force of the state.<sup>15</sup>

12. General Statutes of Minnesota 1913, Section 2800.

13. Ibid, Section 2799

14. Educational Directory of Minnesota, Department of Education 1920-21, p 3.

15. Ibid, p 3.



CHAPTER II  
THE AGGREGATE DEMAND

The need for teachers in any school system will depend primarily upon the number of teachers employed. The larger the teaching force, the greater will be the demand and the larger must be the supply. The aggregate demand for teachers in Minnesota will be shown for each of the three classes of schools, (1) Rural, (2) Elementary, (3) Secondary. It is evident that the aggregate demand for the different years, must bear a relation to the number of pupils enrolled. The tables therefore, include pupil enrollments. The statistics have been compiled for twenty seven years from 1893 to 1920. These data will render it possible to make comparisons and note tendencies. In the official records of the state, schools were originally classified according to the organization of the district as "Common" and "Independent and Special". In 1909 this classification was changed to "Rural" and "High and Graded". While these two classifications are not identical yet all rural schools are maintained in the common districts and most of the high and graded schools are found in the independent and special districts.

A. Aggregate demand in the rural schools:

The rural schools represent the ungraded elementary schools of the state. As soon as a rural school district by growth or consolidation reaches a development where a graded organization is possible; it is classified as a "State Graded" or "State High School" and drops out of the rural classification. By reference to Table I, it may be seen that from 1893 until 1909 there is shown an increase in both teachers employed and pupils enrolled. The sharp decrease in 1909 is due to the changed classification to which reference has

already been made. Since 1909 there has been a steady diminution in the number of pupils enrolled in rural schools. The number of teachers employed since 1909 has remained rather constant with a tendency to decrease especially since 1916.

TABLE I

Aggregate demand for rural teachers  
in the schools of Minnesota.

Year <sup>16</sup>	Number teachers employed <sup>17</sup> Aggregate demand	Enrollment of pupils	Ratio of pupils to teachers
1894 . . . . .	7565 . . . . .	212,194 . . . . .	28
1895 . . . . .	7709 . . . . .	222,228 . . . . .	28.8
1896 . . . . .	7731 . . . . .	221,271 . . . . .	28.6
1897 . . . . .	7913 . . . . .	229,396 . . . . .	28.9
1898 . . . . .	7918 . . . . .	240,254 . . . . .	30.3
1899 . . . . .	8139 . . . . .	229,569 . . . . .	28.2
1900 . . . . .	7878 . . . . .	244,410 . . . . .	31
1901 . . . . .	8131 . . . . .	254,905 . . . . .	31.3
1902 . . . . .	8565 . . . . .	260,101 . . . . .	30.3
1903 . . . . .	8518 . . . . .	248,228 . . . . .	29.1
1904 . . . . .	8714 . . . . .	248,963 . . . . .	28.5
1905 . . . . .	8812 . . . . .	250,927 . . . . .	28.4
1906 . . . . .	8877 . . . . .	248,135 . . . . .	27.9
1907 . . . . .	9022 . . . . .	241,808 . . . . .	26.8
1908 . . . . .	9169 . . . . .	242,435 . . . . .	26.4
1909 <sup>18</sup> . . . . .	8651 . . . . .	220,465 . . . . .	25.4
1910 . . . . .	8719 . . . . .	221,951 . . . . .	25.4
1911 . . . . .	8740 . . . . .	219,776 . . . . .	25.1
1912 . . . . .	8768 . . . . .	217,811 . . . . .	24.8
1913 . . . . .	8858 . . . . .	216,032 . . . . .	24.3
1914 . . . . .	8954 . . . . .	216,568 . . . . .	24.1
1915 . . . . .	8875 . . . . .	215,361 . . . . .	24.2
1916 . . . . .	8886 . . . . .	215,427 . . . . .	24.2
1917 . . . . .	8872 . . . . .	210,340 . . . . .	23.7
1918 . . . . .	8828 . . . . .	207,550 . . . . .	23.5
1919 . . . . .	8633 . . . . .	201,550 . . . . .	23.3
1920 . . . . .	8450 . . . . .	200,462 . . . . .	23.7

16. The figures are for the school year which closes in June of the year given.

17. Statistics taken from Biennial Reports Department of Education, Minnesota, made to the Governor of the state by the Commissioner of Education. The reports are issued each even numbered year. The statistics are from the 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th and 21st Biennial Reports covering the period from 1893 to 1920 inclusive.

18. The classification of schools was changed from "Common" to "Rural".

The typical rural teacher instructs pupils of all ages and grades. The need is for teachers who can handle the many grades and classes. Table II gives the distribution of pupils by grades in the rural schools. The reports from many counties did not give the grade distribution of all the pupils. Out of a total enrollment of 200 thousand in the rural schools, the grade location of 174 thousand was reported.

TABLE II

Enrollment of pupils in rural schools  
by grades<sup>19</sup>

Grade	Enrollment boys	Enrollment girls	Enrollment total
First . . . . .	19,578 . . . . .	16,314 . . . . .	35,892
Second . . . . .	11,512 . . . . .	9,943 . . . . .	21,455
Third . . . . .	10,848 . . . . .	9,883 . . . . .	20,731
Fourth . . . . .	10,898 . . . . .	10,156 . . . . .	21,054
Fifth . . . . .	10,531 . . . . .	9,719 . . . . .	20,250
Sixth . . . . .	9,632 . . . . .	9,249 . . . . .	18,881
Seventh . . . . .	8,667 . . . . .	8,401 . . . . .	17,068
Eighth . . . . .	9,069 . . . . .	9,892 . . . . .	<u>18,961</u>
Total . . . . .			174,292

B. Aggregate demand in the elementary schools:

The elementary schools refer to those schools or departments in schools that are organized on the basis of eight grades. The growth of these

19. Compiled from 1920 reports of county superintendents to State Department of Education. Original reports on file in the office of Commissioner of Education, State Capitol.

schools can be accounted for in two ways; first, by the increase in pupil enrollment in schools already organized, and second, by the organization of graded schools from rural schools. Table III shows the aggregate demand for teachers of this class from year to year. The growth has been constant for both teachers and pupils. The ratios indicate an increase in teachers more rapid than in pupil enrollments. Principals in graded and elementary schools who give the major portion of their time to grade instruction or supervision are included in the number of elementary teachers.

TABLE III

Aggregate demand for elementary teachers  
in the graded schools and high schools of Minnesota.

Year	Elementary teachers			Elementary pupils			Ratio of pupils to teachers
	Graded Schools <sup>20</sup>	High Schools <sup>22</sup>	Total <sup>21</sup>	Graded Schools <sup>20</sup>	High Schools <sup>22</sup>	Total <sup>21</sup>	
1894	...	...	2506	...	...	116789	46.6
1895	...	...	2713	...	...	120435	44.3
1896	...	...	2741	...	...	124822	45.5
1897	...	...	2922	...	...	128646	44
1898	...	...	2901	...	...	132292	45.6
1899	...	...	2844	...	...	136132	47.8
1900	...	...	2214 <sup>23</sup>	...	...	138069	62.3 <sup>24</sup>
1901	...	...	2446 <sup>23</sup>	...	...	145210	59.3 <sup>24</sup>
1902	...	...	3411	...	...	148461	43.5
1903	629	...	3426	...	...	150081	43.8
1904	707	...	3665	29263	...	156078	42.5
1905	784	...	3683	28500	...	158863	43.1
1906	739	...	3850	25594	...	161449	41.9
1907	727	...	3978	25298	...	163617	41.1
1908	757	...	4269	24792	...	163783	38.3
1909 <sup>25</sup>	796	...	4983	26194	...	187606	37.6
1910	840	...	5181	26455	...	188555	36.3
1911	951	...	5402	29543	...	192560	35.6
1912	1000	...	5667	30005	...	193445	34.1
1913	1050	...	5765	30880	...	196094	34
1914	1159	...	5979	33669	...	203361	34
1915	1242	...	6279	35181	...	208325	33.1
1916	974	5014	5988	31595	180331	211926	35.3
1917	1060	5162	6222	34073	185506	219579	35.2
1918	1101	5322	6423	33761	190997	224758	34.9
1919	1220	5751	6971	33620	179637	213257	30.5
1920	1244	6028	7272	34846	199494 <sup>26</sup>	234340	32.2

20. Figures taken from Annual Reports of the Inspector of State Graded Schools, State of Minnesota for years 1903 to 1920 inclusive.

The distribution of teachers among the different elementary grades for any year may be approximated by dividing the total enrollments in the respective grades by the ratio of pupils to teachers for that particular year. Table IV works out the distribution of elementary teachers employed in 1920. In the year 1920, there was employed one elementary teacher for every 32.2 pupils enrolled.<sup>27</sup> This ratio has been used to compute the teacher need for each grade.

TABLE IV

Aggregate demand for elementary teachers  
year 1920, analyzed on basis of need for each grade.

Grade	Pupils enrolled		Total	Number teachers required
	Graded Schools <sup>28</sup>	High Schools <sup>29</sup>		
Kindergarten	...	17055	17055	529
First	5932	31138	37070	1150
Second	4250	23714	27964	868
Third	4338	22311	26649	827
Fourth	4272	22650	26922	836
Fifth	4303	22211	26514	823
Sixth	4054	21283	25337	786
Seventh	3984	21028	25012	776
Eighth	3713	18104	21817	677
Total . . . . .	34846	199494	234340	7272

21. Figures for the years 1894 to 1915 inclusive are taken from Biennial Reports Department of Education, Minnesota to the Governor of Minnesota by the Commissioner of Education. The statistics in the Biennial Reports give total number of pupils and teachers in grades and high school. To get number of elementary pupils and teachers the numbers of secondary pupils and teachers have been subtracted from the totals.
22. Figures taken from Annual Reports of Inspector of State High Schools, State of Minnesota, for the years 1916 to 1920 inclusive. No complete statistics of the number of elementary teachers and pupils were included in these reports until 1916. In these reports the teachers are classified as "Grade", "High School" and "Special". One-third of the "Special" teachers are included as elementary teachers.
23. A study of the reports indicates that the Minneapolis city teachers were not reported for the years 1900 and 1901. The number should be corrected by the addition of 780 for each year. This would give 2994 teachers in 1900 and 3226 in 1901.
24. On the basis of the correction noted above the ratio would be 46.1 for 1900 and 45 for 1901.

C. Aggregate demand in secondary schools:

The secondary schools of the state are divided into two classes:

1. State high schools. These schools offer instruction in the ninth, tenth, eleventh and twelfth grades. High school subjects may be taught in certain graded schools but every state high school in Minnesota has a four year course.

2. High school departments in graded schools.<sup>30</sup> A state graded school must employ four grade teachers. In addition to the elementary work most of these schools offer some high school instruction, some only one year, some full four years. To receive recognition for high school instruction "Graded Schools" must employ qualified high school instructors in addition to the required four grade teachers.

Table V shows the aggregate demand for secondary teachers in both state high schools and high school departments in state graded schools. Superintendents, principals and teachers of special subjects who give the major portion of their time to high school instruction are included in the list of secondary teachers. The table reveals the rapid growth in the number of secondary teachers and pupils. In the ten years from 1910 to 1920 the number of secondary teachers has nearly trebled while the number of pupils has doubled

25. The classification was changed from "Independent and Special" to "High and Graded Schools".
26. This includes 17055 kindergarten pupils. This is the first time that kindergarten pupils have been reported although kindergarten teachers have been reported for several years.
27. See Table III, p 18.
28. Statistics from Twenty-Fifth Annual Report State Graded Schools, School Year Ending June 30, 1920, Department of Education, State of Minnesota, Table II, p 20.
29. Statistics from Twenty-Seventh Annual Report of the Inspector of Minnesota State High Schools for the School Year Ending June 30, 1920, Summary No.II, p 16.

TABLE V

Aggregate demand for secondary teachers in the graded schools and high schools of Minnesota.

Year	Secondary teachers			Secondary pupils			Ratio of pupils to teachers
	Graded Schools <sup>31</sup>	High Schools <sup>32</sup>	Total	Graded Schools <sup>31</sup>	High Schools <sup>32</sup>	Total	
1894	...	251	251	...	7259	7259	28.9
1895	...	288	288	...	9402	9402	33
1896	...	340 <sup>33</sup>	340	...	10143 <sup>33</sup>	10143	29.8
1897	...	403	403	...	11218	11218	27.8
1898	...	424	424	...	11377	11377	26.8
1899	...	442	442	...	11742	11742	26.6
1900	...	494	494	...	12802	12802	25.9
1901	...	555	555	...	14170	14170	25.5
1902	...	629	629	...	15715	15715	25
1903	...	675 <sup>34</sup>	675	...	17000 <sup>34</sup>	17000	25.2
1904	...	704	704	...	18622	18622	26.4
1905	...	825	825	...	20215	20215	24.5
1906	...	870	870	...	22106	22106	25.4
1907	...	928	928	...	23687	23687	25.5
1908	...	992	992	...	24530	24530	24.7
1909	30 <sup>35</sup>	1095	1125	455	26583	27038	24
1910	64 <sup>35</sup>	1193	1257	1015	28562	29577	23.5
1911	100 <sup>35</sup>	1342	1442	1485	29971	31456	21.1
1912	96 <sup>35</sup>	1542	1638	1532	33295	34827	21.2
1913	118 <sup>35</sup>	1591	1709	1877	34854	36731	21.4
1914	138 <sup>35</sup>	1849	1987	2431	36703	39134	19.6
1915	160 <sup>35</sup>	1962 <sup>36</sup>	2122	2854	39520	42374	19.9
1916	205	2548 <sup>36</sup>	2753	5081	42273	47354	17.2
1917	255	2853 <sup>36</sup>	3108	6057	45928	51985	16.7
1918	356	2963 <sup>36</sup>	3319	6425	44491	50916	15.3
1919	353	3044 <sup>36</sup>	3397	6418	45457	51875	15.2
1920	404	3123 <sup>36</sup>	3527	6722	49060	55782	15.8

30. General Session Laws of Minnesota 1915, Chapter 296, Section 5.

31. Statistics from Annual Reports of the Inspector of State Graded Schools for the years 1909 to 1920 inclusive.

32. Statistics from Annual Reports of the Inspector of State High Schools for the years 1894 to 1920 inclusive.

33. No Annual Report printed; figures taken from Summary in Annual Report for 1897.

34. Estimated. No Annual Report issued. No statistics available.

35. Estimated on basis of two teachers for each high school department in graded schools.

36. Includes two-thirds of the teachers listed in Annual Reports as "Special".

The aggregate demand for secondary teachers in high schools, represents a demand for instructors in the many subjects and groups of subjects taught in these schools. The demand among the different subjects varies. The demand in a particular subject depends upon (a) number of pupils registered for the subject, (b) recitation and laboratory demand upon a teacher's time, and (c) the average size of classes in that subject based upon the experience in the state. Tables VI and VII give data upon the enrollment of pupils in high school subjects. The statistics are for the school year 1919-1920.

TABLE VI

Enrollment of pupils in high school subjects. - Statistics for 1919-20

Subjects	Enrollment		Total
	High schools <sup>37</sup>	Graded schools <sup>38</sup>	
<u>English:</u>			
English I	16584	2829	19413
" II	12741	1877	14618
" III	10008	990	10998
" IV	7291	961	8252
Spelling	552	...	552
Public Speaking	1466	...	1466
<u>Social Studies:</u>			
Community Civics	864	...	864
Social Problems	848	...	848
Economics	2644	...	2644
Ancient History	8733	1833	10566
Modern History	6374	1332	7706
American History	6687	833	7520
American Government	5936	1168	7104
English History	369	...	369
<u>Science:</u>			
General Science	5684	906	6590
Biology	889	...	889
Physiology	3082	1278	4360
Botany	3072	1123	4195
Zoology	1450	478	1928
Geology	11	...	11
Physiography	2092	1195	3287
Physics	3835	518	4353
Chemistry	4790	502	5292



Subjects	Enrollment		Total
	High Schools	Graded Schools	
<u>Mathematics:</u>			
Elementary Algebra	14929	2864	17793
Higher Algebra	1892	259	2151
Plane Geometry	10756	1571	12327
Solid Geometry	1525	107	1632
Trigonometry	351	...	351
<u>Foreign Languages:</u>			
Latin Grammar	5711	1015	6726
Caesar	3262	340	3602
Cicero	582	8	590
Virgil	510	...	510
German I	40	13	53
German II	18	15	33
German III	2	...	2
German IV	0	...	0
French I	3829	164	3993
French II	2823	43	2866
Swedish I	147	...	147
Swedish II	91	...	91
Norse I	270	...	270
Norse II	172	...	172
Spanish I	1219	...	1219
Spanish II	425	...	425
<u>Agriculture:</u>			
Field Crops	1019	633	1652
Animal Husbandry	726	359	1085
Farm Mechanics	318	...	318
Soils	307	...	307
Horticulture	288	...	288
Dairying	90	...	90
Farm Economics	252	...	252
<u>Industrial:</u>			
Wood Work I	3909	682	4591
Wood Work II	2002	...	2002
Iron Work	1112	...	1112
Mechanical Drawing I	1768	201	1969
Mechanical Drawing II	1019	...	1019
Industrial History	1123	...	1123
<u>Home Training:</u>			
Cooking I	4386	1244	5630
Cooking II	2146	...	2146
Sewing I	4467	1250	5717
Sewing II	2386	...	2386
Chemistry Foods	383	...	383
Home Nursing	142	...	142

Subjects	Enrollment		Total
	High Schools	Graded Schools	
<u>Commercial:</u>			
Bookkeeping I	4196	409	4605
Bookkeeping II	909	...	909
Shorthand I	3328	...	3328
Shorthand II	1807	...	1807
Typewriting I	4721	...	4721
Typewriting II	2073	...	2073
Commercial Geography	5161	720	5881
Commercial Arithmetic	4613	679	5292
Penmanship	1630	...	1630
Commercial Law	1746	...	1746
Office Practice	29	...	29
Business English	2565	...	2565
<u>Fine Arts:</u>			
Music I	6453	...	6453
Music II	4459	...	4459
Freehand Drawing	1836	...	1836
<u>Physical Training:</u>			
Physical Training I	8810	...	8810
Physical Training II	3806	...	3806
<u>Miscellaneous:</u>			
Military Drill	29	...	29
Psychology	38	...	38
Vocational Guidance	48	...	48
Current Events	21	...	21
Commerce & Industry	62	...	62
Industrial Science	218	...	218
Plant Industry	62	...	62
Salesmanship	172	...	172
Printing	145	...	145
Gas Engine	141	...	141
Electricity	66	...	66
Advertising	12	...	12
Journalism	30	...	30
Applied Art	265	...	265
Sanitation	21	...	21
Pedagogy	36	...	36
Rural School Management	48	...	48

37. Twenty-Seventh Annual Report Inspector of Minnesota High Schools for Year Ending June 30, 1920. Table V pp 40, 41 & 42.

38. Twenty-Fifth Annual Report State Graded Schools, School Year Ending June 30, 1920. Table XI, p 54.

TABLE VII

Summary - Enrollment of pupils in high school  
subject-groups - statistics 1919-1920.

<u>Subject-group</u>	<u>Total enrollment of pupils</u>	
	<u>Number</u>	<u>per cent</u>
English	55299	20
Social Studies	37621	13
Science	30905	11
Mathematics	34254	13
Foreign Languages	20699	8
Agriculture	3992	1
Industrial	11816	4
Home Training	16404	6
Commercial	34586	13
Fine Arts	12748	5
Physical Training	12616	5
Miscellaneous	<u>1414</u>	1
Total . . . . .	272354	

## CHAPTER III

## THE ANNUAL DEMAND

The number of teachers required each year to replace teachers who leave the work and to provide for growth, constitutes the annual demand. It has already been pointed out<sup>39</sup> that the annual demand of a system may be determined in one of two ways. The investigation may be directed to a determination of the number of teachers entering the system or to a determination of the number of teachers who drop out. In the latter case account must be made of growth. In other words, provision must be made not only for replacement of those who drop out but for an additional number to care for growth and expansion.<sup>40</sup> In the computation of annual demand in this chapter both methods have been used. In the case of rural schools, the annual demand has been studied by the first method. In the case of elementary and high school teachers, the second method has been followed.

A. Annual demand in rural schools:

A questionnaire was sent to every county superintendent in the state.<sup>41</sup> This questionnaire was sent out under date of December 29, 1920 and called for information concerning the number, qualifications and salaries of teachers employed in the rural schools. At this point we are interested in the following

39. See above, Chapter I, p 9.

40. In case the aggregate demand for teachers is decreasing, the annual decrease should be subtracted from the replacement number.

41. See Appendix, Form 1.

data taken from the reports:

- I. Number of teachers holding positions in the rural schools, year 1920-21.
- II. Number positions not filled.
- III. Total number teachers required for all rural school positions (aggregate demand).
- IV. Number teachers teaching for first time this year.

The reports were assembled in Table VIII. Complete reports were received from all the eighty-six counties of the state except Benton and Wilkin. In the case of these two counties estimates have been made on the basis of official reports of former years. The columns are numbered to correspond to the above designation of the data.

TABLE VIII

The annual demand for rural teachers -  
based on statistics for year 1920-21

County	I	II	III	IV
Aitkin	138	3	141	28
Anoka	57	0	57	11
Becker	140	0	140	16
Beltrami	162	0	162	36
Benton	63	0	63	8
Big Stone	55	0	55	5
Blue Earth	115	0	115	14
Brown	79	0	79	25
Carlton	73	0	73	26
Carver	60	3	63	11
Cass	114	0	114	40
Chippewa	85	2	87	18
Chisago	61	0	61	14
Clay	92	1	93	14
Clearwater	62	0	62	11
Cook	16	0	16	3
Cottonwood	78	0	78	22
Crow Wing	92	0	92	20
Dakota	93	0	93	11
Dodge	76	0	76	14

County	I	II	III	IV
Douglas	100	0	100	12
Faribault	115	0	115	20
Fillmore	159	0	159	25
Freeborn	127	2	129	33
Goodhue	150	0	150	31
Grant	62	2	64	13
Hennepin	122	0	122	15
Houston	91	0	91	8
Hubbard	65	0	65	14
Isanti	78	0	78	11
Itasca	134	1	135	26
Jackson	92	0	92	15
Kanabec	61	0	61	9
Kandiyohi	119	0	119	18
Kittson	79	0	79	22
Koochiching	62	0	62	18
Lac qui Parle	101	4	105	15
Lake	28	2	30	3
LeSueur	85	0	85	11
Lincoln	79	0	79	17
Lyon	87	0	87	17
McLeod	80	0	80	17
Mahnomen	35	1	36	9
Marshall	141	0	141	30
Martin	108	0	108	17
Meeker	93	0	93	19
Mille Lacs	74	0	74	12
Morrison	140	2	142	20
Mower	110	0	110	29
Murray	104	0	104	18
Nicollet	64	0	64	34
Nobles	105	0	105	16
Norman	106	6	112	13
Olmsted	114	1	115	24
Otter Tail	296	5	301	137
Pennington	71	1	72	12
Pine	119	0	119	22
Pipestone	69	2	71	9
Polk	194	0	194	18
Pope	82	0	82	15
Ramsey	35	0	35	5
Red Lake	57	1	58	11
Redwood	111	1	112	16
Renville	125	0	125	18
Rice	102	0	102	21
Rock	75	0	75	8
Roseau	98	4	102	17
St. Louis	176	0	176	55
Scott	68	3	71	7
Sherburne	50	0	50	6
Sibley	78	0	78	11

County	I	II	III	IV
Stearns	217	0	217	25
Steele	90	0	90	30
Stevens	61	0	61	7
Swift	90	0	90	12
Todd	141	0	141	31
Traverse	56	0	56	5
Wabasha	90	0	90	15
Wadena	66	3	69	24
Waseca	95	0	95	7
Washington	71	0	71	7
Watsonwan	62	2	64	15
Wilkin	74	0	74	7
Winona	79	5	84	16
Wright	106	2	108	25
Yellow Medicine	94	0	94	22
Total	8179	59	8238	1594

Summary:

- I. Number teachers holding positions in rural schools . . 8179
- II. Number positions not filled . . . . . 59
- III. Aggregate demand . . . . . 8238
- IV. Number teachers teaching for first time this year . . 1594
- V. Annual demand, sum of columns II and IV . . . . . 1653

With these statistics, it is possible to determine the replacement number (r) for the year 1921. This will be the number of teachers needed to replace teachers who dropped out in 1920 and maintain a constant aggregate demand. By reference to Table I, we find there were 8450 rural teachers employed in 1920. How many new (inexperienced) teachers would be required to replace those who dropped out in 1920 and maintain an aggregate teaching force of 8450? This number will be the replacement number. It will equal the sum of the following:

1. Number teachers teaching for first time  
this year . . . . . 1594
  2. Number positions not filled . . . . . 59
  3. Number representing decrease in teachers . . 212
- Total . . . . . 1865

This number 1865 is the replacement number for 1921. It is the number of teachers required for replacement to maintain the aggregate demand of 1920. With a teaching force of 8450 teachers in the rural school field, 1865 teachers annually leave the service. If 8450 is divided by 1865, the quotient would give the duration of the supply based on the principle of averages. The quotient is 4.53. In other words, the average length of service (a) of rural school teachers in Minnesota is 4.53 years. This relation is expressed by the formula  $r = \frac{D}{a}$  or  $a = \frac{D}{r} = \frac{8450}{1865} = 4.53$ .<sup>42</sup>

Accepting this figure for the average length of service it is simply a matter of computation to show the annual demand for the years just past. Table IX shows the computed annual demands for the past ten years. Replacement in any year is the measure of the number who dropped out the previous year.

TABLE IX

The annual demand for rural teachers  
for years 1910 to 1921.

Year	Aggregate demand	Replacement	Increment	Increment <sup>43</sup> per cent	Annual demand
1910	8719	...	...	...	...
1911	8740	1925	21	.24	1946
1912	8768	1929	28	.32	1957
1913	8858	1936	90	1.02	2026
1914	8954	1955	96	1.08	2051
1915	8875	1977	-79	-.882	1898
1916	8886	1959	11	.123	1970
1917	8872	1962	-14	-.157	1948
1918	8828	1958	-44	-.495	1914
1919	8633	1948	-195	-2.2	1753
1920	8450	1905	-183	-2.1	1722
1921	8238	1865	-212	-2.51	1653
Average . . .			-43	-.50	

42. See above, Chapter I, p 9.

43. See above, foot note No. 7, p 12.



## B. Annual demand in elementary schools:

In the case of elementary teachers, the study was directed to the teachers in the service, to learn the average length of service of workers of this class. The number of teachers who drop out each year will depend upon the average length of service of the teachers in the system. The reciprocal of the number representing the years of service will be the fractional part of the teaching force who drop out each year. In a system where the length of service averages 3 years, one-third of the teachers would drop out yearly. If the service was 4 years, one-fourth of the teachers would drop out. The record of over one thousand teachers of the state was studied. The experience of the elementary teachers employed in seventy-three schools for the year 1919-1920 was analyzed and tabulated. The data were obtained from the Teachers Qualification Reports submitted by the principals and superintendents to the State Department of Education at the opening of the school year. The places selected and the distribution of teachers were as follows:

<u>High Schools</u>	<u>No. Teachers</u>	<u>High Schools</u>	<u>No. Teachers</u>
Amboy	5	Lakefield	10
Atwater	5	Long Prairie	8
Bemidji	38	Mankato	33
Blackduck	5	Mapleton	5
Dodge Center	5	Mantorville	4
Duluth	437	Pelican Rapids	8
Eagle Bend	5	Perham	5
Ely	52	Pine City	8
Fergus Falls	31	Plainview	8
Hayfield	7	Red Lake Falls	6
Heron Lake	7	Sandstone	15
Hinckley	6	Staples	17
Jackson	12	Tower	9
Kasson	7	Wabasha	6
Lake City	13	West Concord	5
Lake Crystal	8	Willmar	26

<u>Graded Schools</u>	<u>No. Teachers</u>	<u>Graded Schools</u>	<u>No. Teachers</u>
Askov	5	Madison Lake	3
Battle Lake	5	Mazeppa	4
Baudette	8	Meadowlands	5
Bertha	5	New London	5
Brook Park	4	New York Mills	5
Browerville	4	Okabena	4
Bruno	4	Oklee	4
Burtrum	4	Parkers Prairie	5
Claremont	4	Petersburg	5
Clarissa	4	Raymond	4
Deer Creek	5	St. Clair	4
Elgin	4	Saum	4
Finlayson	4	Soudan	9
Floodwood	7	Spooner	6
Garden City	4	Tenstrike	4
Grey Eagle	5	Vernon Center	5
Good Thunder	5	Vining	5
Hines	4	Williams	4
Henning	5	Willow River	4
Kelliher	4	Zumbro Falls	4
Kellogg	4		

	<u>Number Schools</u>	<u>Number Teachers</u>
Graded schools . . . . .	41	191
High schools . . . . .	<u>32</u>	<u>816</u>
Total . . . . .	73	1,007

The cases selected appear to constitute a very satisfactory sampling of the general condition among elementary teachers. The list includes Duluth with 437 teachers. At first this number may seem out of proportion. It must be remembered that the three large cities of the state, St. Paul, Minneapolis and Duluth employ nearly 40% of the elementary teachers of the state. In this study the Duluth teachers constitute 43% of the total number of cases. The 191 teachers found in graded schools are 18% of the cases while in the entire state elementary teachers employed in the graded schools constitute 17% of the total number of such teachers. The distribution of these elementary teachers according to experience was as follows:

<u>Number of teachers</u>	<u>Experience in years</u>	<u>Number of teachers</u>	<u>Experience in years</u>
131	1	8	23
112	2	10	24
115	3	11	25
76	4	9	26
80	5	6	27
45	6	4	28
51	7	4	29
35	8	0	30
42	9	1	31
31	10	2	32
33	11	1	33
32	12	3	34
20	13	0	35
25	14	2	36
16	15	3	37
26	16	0	38
9	17	0	39
13	18	2	40
13	19	0	41
8	20	0	42
14	21	1	43
13	22		

Total number of teachers . . . . . 1007

Average experience . . . . . 8.18 years

Median . . . . . 4.86 years

The validity of the conclusion that the average length of service of elementary teachers in Minnesota is 8 years, has been tested by several studies. Two of these investigations will be mentioned.

1. The length of experience of all elementary teachers employed in the graded and high schools of St. Louis County was tabulated from the official Teachers Qualification Reports submitted to the State Department of Education for the year 1919-20. This study again included the city of Duluth with 437 elementary teachers. All of the 1102 cases were studied. These cases represented the elementary teaching force in sixteen towns and cities of St. Louis county. The computation gave an average length of service of 8.1 years. This result agrees with the conclusion reached as to the average length of

service for elementary teachers in Minnesota.

2. To answer the question whether conditions growing out of the war had produced any marked change in the length of service rendered by teachers, some comparisons were made between the years 1919-20 and 1915-16. For this investigation the list of schools used in the detailed study was selected.<sup>44</sup> The records were incomplete for the city of Duluth and this place was omitted. This made a list of 72 villages and cities. These places represented the smaller towns of the state, employing many inexperienced teachers and others with limited experience. Unfortunately the records for 1915-16 gave the experience of normal graduates only and their experience following graduation. It is likely that some of these teachers had taught prior to graduation. The length of experience then, as shown in 1915-16, is less than was the actual case. While no data are available upon which to form a judgment, it is probable that experience prior to graduation would increase the reported experience 10 per cent.

The experience of the teachers employed in the seventy-two towns for the years 1915-16 and 1919-20 was as follows:

<u>Number of teachers 1915-16</u>	<u>Years of Experience</u>	<u>Number of teachers 1919-20</u>
46	1	77
78	2	69
36	3	61
34	4	39
22	5	37
30	6	20
16	7	24
26	8	21
19	9	22
15	10	14
8	11	16
3	12	15
5	13	8

44. See above, pp 31 & 32.

<u>Number of teachers 1915-16</u>	<u>Years of Experience</u>	<u>Number of teachers 1919-20</u>
2	14	9
3	15	4
8	16	12
3	17	5
4	18	1
1	19	6
3	20	2
2	21	3
3	22	5
0	23	2
1	24	3
1	25	5
1	26	4
0	27	3
2	28	0
0	29	0
0	30	0
0	31	0
0	32	1
0	33	0
0	34	0
<u>1</u>	<u>35</u>	<u>0</u>

Total.. 372

Total.. 488

Average 6.03 years

Average 6.68 years

When account is taken of the unreported experience of teachers in 1915-16, it appears that there is close correlation in the length of service of teachers for the two separate periods. The average length of service for 1919-20 appears 11 per cent greater than for 1915-16. Actually it was evidently about the same. The length of service of teachers of a particular group is quite constant for a series of years, provided the group represents uniformity of professional training and the conditions of service are the same.

If the average length of service of elementary teachers is placed at 8.18 years, it will be possible to compute the annual demand for the years past, as was done in the case of rural teachers<sup>45</sup> by the use of the formula  $r = \frac{D}{a}$

45. See above, p 30.

Table X shows the annual demands for ten years from 1910 to 1920. The general tendency is shown in the column marked "Increment".

TABLE X

The annual demand for elementary teachers  
years 1910 to 1920

<u>Years</u>	<u>Aggregate demand</u>	<u>Replacement</u>	<u>Increment</u>	<u>Increment per cent</u>	<u>Annual demand</u>
1909	4983				
1910	5181	609	198	4	807
1911	5402	633	221	4.3	854
1912	5667	660	265	4.9	925
1913	5765	693	98	1.7	791
1914	5979	705	214	3.7	919
1915	6279	731	300	5	1031
1916	5988	768	-291	-4.6	477
1917	6222	732	234	3.9	966
1918	6423	761	201	3.2	962
1919	6971	785	548	8.5	1333
1920	7272	852	301	4.3	1153

Average . . . . . 208 . . . . . 3.53

#### C. Annual demand in secondary schools:

The same procedure has been followed to determine the annual demand for secondary teachers as was followed in the case of elementary teachers under "B" of this chapter. A study was made of the years of experience of the secondary teachers employed in the seventy-three representative schools of Minnesota selected in the study of length of service of elementary teachers.<sup>46</sup> The length of experience of the 464 secondary teachers employed in these schools was noted. The distribution was as follows:

46. See above, pp 31 & 32, for the list of schools.

<u>Number of teachers</u>	<u>Experience in years</u>	<u>Number of teachers</u>	<u>Experience in years</u>
86	1	4	20
67	2	1	21
58	3	6	22
37	4	0	23
29	5	0	24
25	6	1	25
20	7	2	26
10	8	0	27
22	9	1	28
18	10	1	29
17	11	0	30
13	12	3	31
8	13	1	32
4	14	1	33
8	15	0	34
6	16	0	35
8	17	1	36
3	18	1	37
2	19		

Total number of teachers . . . . . 464

Average experience . . . . . 6.36 years

Median . . . . . 3.56 years

Accepting then the average length of service for secondary teachers as 6.36 years, it is a matter of computation to show the replacements and annual demands for the years that have past. Using the formula  $r = \frac{D}{a}$ , table XI is obtained.

TABLE XI  
The annual demand for secondary teachers - 1910 to 1920

<u>Years</u>	<u>Aggregate<sup>47</sup> demand</u>	<u>Replacement</u>	<u>Increment</u>	<u>Increment per cent</u>	<u>Annual demand</u>
1909	1125				
1910	1257	177	132	11.7	309
1911	1442	198	185	14.7	383
1912	1638	227	196	13.6	423
1913	1709	258	71	4.3	329
1914	1987	269	278	16.3	547
1915	2122	312	135	6.8	447
1916	2753	334	631	29.7	965
1917	3108	434	355	12.9	789
1918	3319	489	211	6.8	700
1919	3397	522	78	2.4	600
1920	3527	534	130	3.8	664

<u>Years</u>	<u>Aggregate demand</u>	<u>Replacement</u>	<u>Increment</u>	<u>Increment per cent</u>	<u>Annual demand</u>
Average . . . . .			218	11.18	

This chapter may be concluded by a summary of the conclusion reached with regard to the demand for teachers of the different classes based on the statistics for 1920.

	<u>A</u>	<u>B</u>	<u>C</u>	<u>Total</u>
	<u>Rural</u>	<u>Elementary</u>	<u>Secondary</u>	
Aggregate demand 1920	8450	7272	3527	19249
Replacement	1865	852	534	3251
Increment	-212	301	130	219
Annual demand	1653	1153	664	3470

47. See above, Table V, p 21.



## CHAPTER IV

FORECAST OF FUTURE AGGREGATE  
AND ANNUAL DEMANDS

In making estimates of future demands for teachers in the state of Minnesota, it is necessary to consider the factors which determine the number of teachers employed in the system. Only as needs for teachers are understood and educational tendencies are studied, can we hope to estimate, with any degree of accuracy, future demands. What then, are some factors which determine the demand for teachers in the state?

1. Population - A rapidly increasing population will make urgent demand for an increased teaching force. The distribution of population between urban and rural communities will measure to a certain degree the demand in different classes of schools. A study of population by different school age groups will indicate the way youth of certain ages are availing themselves of school opportunities. The possibility of the schools reaching a larger percentage of school population will be revealed. The ages of 5 to 13 years inclusive are the normal years for attendance at the elementary schools. The ages 14 to 17 inclusive are the normal years for pupils enrolled in the four year secondary schools.

As a basis for comparisons, some statistics concerning the population of Minnesota are presented. The discussion of these statistics and the application of the facts to the problem of future demands for teachers will be taken up in connection with the study of demand for each of the three classes of schools, rural, elementary and secondary.

TABLE XII  
Population of Minnesota  
1850 - 1920

Years	Urban		Rural		Total	Decennial Number	Increase Per cent
	Number	Per cent	Number	Per cent			
1850	...	...	...	...	6077 <sup>48</sup>	...	...
1860	...	...	...	...	172023 <sup>48</sup>	165946	...
1870	...	...	...	...	439706 <sup>48</sup>	267683	155.6
1880	...	...	...	...	780773 <sup>49</sup>	341067	77.6
1890	443049 <sup>50</sup>	33.8	867234 <sup>50</sup>	66.2	1310283 <sup>49</sup>	521053	66.7
1900	598100 <sup>50</sup>	34.1	1153294 <sup>50</sup>	65.9	1751394 <sup>49</sup>	441111	33.7
1910	850294 <sup>50</sup>	41	1225414 <sup>50</sup>	59	2075708 <sup>49</sup>	324314	18.5
1920	...	...	...	...	2386371 <sup>51</sup>	310663	14.9

Population of school age in Minnesota

Year	Number 5 to 13 years <u>inclusive</u>	Number 14 to 17 years <u>inclusive</u>
1880	175207 <sup>52</sup>	62368 <sup>52</sup>
1890	273573 <sup>53</sup>	103105 <sup>53</sup>
1900	372635 <sup>54</sup>	141105 <sup>54</sup>
1910	434635 <sup>55</sup>	170925 <sup>55</sup>
1920	499830 <sup>56</sup>	196472 <sup>56</sup>

2. School enrollment. This is the most reliable single factor in measuring the demand for teachers. Other factors may be said to increase enrollment and thus increase the need for teachers.

48. Statistics of Population, Ninth Census of the United States, Table II, p 40.

49. Thirteenth Census of the United States, Volume II, Population, p 958.

50. Ibid p 960.

51. The Fourteenth Census of Population in the United States, published by Federal Trade Information Service, New York.

52. Tenth Census of the United States 1880.

53. Eleventh Census of the United States 1890.

54. Twelfth Census of the United States 1900, Volume II, Population, Part II pp 54 & 55.

3. Average length of service for teachers. It has already been pointed out that the annual demand in a system is conditioned upon the length of service rendered by the teachers employed. It is probable that the length of service is fairly constant and that for the next ten years the average length of service will not show much change. This conclusion is reached in view of the large number of teachers involved and the stability of the social and economic conditions which operate to call, hold or lose teachers to the teaching profession. In all forecasts of future demands and in all computations, the results of investigations given in Chapter III will be accepted for average length of service. Average length of service for rural teachers will be taken as 4.53 years, elementary teachers 8.18 years and secondary teachers 6.36 years.

4. School administration standards. In Minnesota standards have been established by administrative authorities. These standards limit size of classes and regulate the disposition of the time of teachers. In every field there has been a steady decrease in the average enrollment per teacher. This tendency results in the number of teachers increasing more rapidly than pupils. The present increase in teachers' salaries and general cost of school maintenance will tend to limit or reduce the number of teachers in relation to pupil enrollment.

5. Changing social requirements. Changed social conditions make new demands upon the schools, resulting in the introduction of new courses and activities and the attraction of increasing numbers of students. As social demands upon the schools multiply, the need for teachers is greater. These

55. Thirteenth Census of the United States 1910.

56. Estimated.

social demands are reflected in public opinion and in civil laws which prescribe requirements for schools. A bill now before the Minnesota legislature would increase the compulsory school age to 18 years, compelling pupils who have reached the present age limit of 16 years to continue in attendance at a full-time school or work and attend a part-time school.<sup>57</sup>

To sum up this general discussion in terms of the units and formulae proposed in Chapter I for measuring teacher demands, it may be assumed:

1. Average length of service ( $a$ ) is a known quantity, relatively constant for each of the three fields of service.
2. Aggregate demand ( $D$ ) is a statistical fact established for the present and past years.
3. Replacement ( $r$ ) can be computed for any year if the aggregate demand for the preceding year is known.
4. Increment ( $i$ ) is a variable quantity which, while it can not be determined absolutely, can be approximated within reasonable limits.
5. Starting with a present known aggregate demand and having determined the basis for the computation of increment, a table can be constructed showing annual demands for a series of future years by the use of formulae.

Having presented, in general, the factors which enter into any consideration of the future demand for teachers, the three specific fields will be taken up in detail.

A. Future demands in the rural schools:

The situation in the rural school field shows a decided tendency to be static. A study of the facts given in Tables I<sup>58</sup> and XII<sup>59</sup> will reveal

57. Report of the State Board of Education Upon the Revision of State Aid 1920, pp 16 & 17.

58. See above p 16.

59. Ibid, p 37.

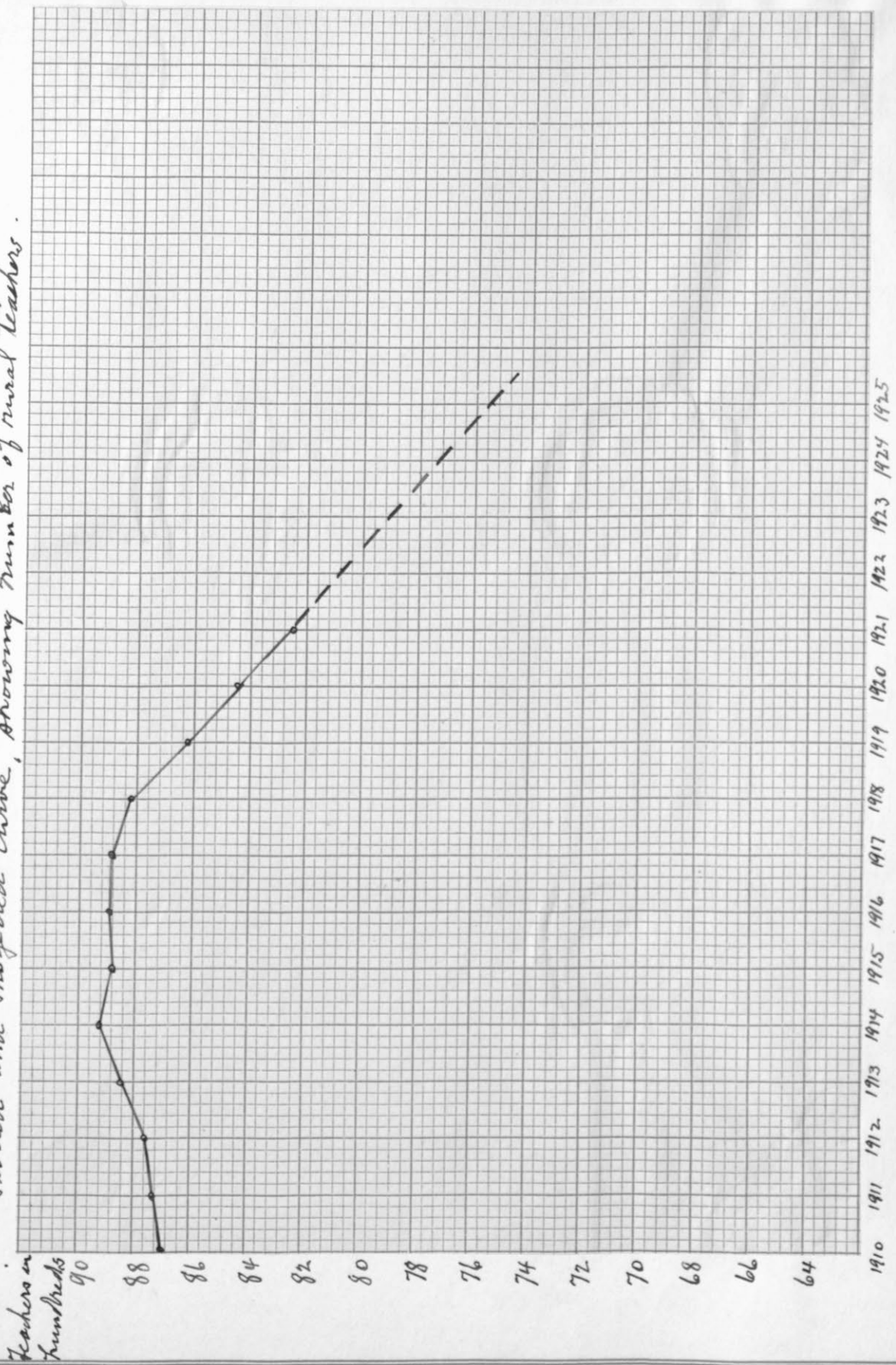
little change during the years covered by the statistics. While each decennial has shown an increase in the population of Minnesota, the per cent of increase has been growing less with each census. For the ten year period ending 1920, the increase was about 15 per cent or an annual increase of  $1\frac{1}{2}$  per cent. The per cent of increase in rural communities is even less than the per cent of increase in the state in general due to the tendency of the inhabitants to shift from rural to urban communities.

In the matter of enrollment there has been a gradual falling off. Statistics for rural schools as defined in this investigation have been collected since 1908. The largest enrollment since that time was recorded in 1910. Since that date, the total enrollment in rural schools has decreased from 221,951 in 1910 to 200,462 in 1920.

While the total number of rural teachers employed has not decreased as rapidly as enrollment, there has been a decline from 8954 teachers in 1914 to 8450 in 1920.

There is however a close correlation between rural population, enrollment of pupils and number of teachers employed. There has been little variation in these factors for many years. There appears to be little probability of new demands for rural teachers. Under these conditions a curve has been plotted showing the aggregate demands for teachers for the past ten years. This curve has been projected to indicate future demands on the basis of the tendency of the plotted curve. Diagram 1, shows the plotted and projected curve.

Diagram 1.  
 Plotted and Projected Curve, showing number of rural teachers.



By reading the projected curve, we get the estimates of future aggregate demands for rural teachers. By using the formula  $r = \frac{D}{a}$ , the following table is constructed, showing the probable future annual demands in this field. The average length of service ( $a$ ) for rural teachers is the constant 4.53.

TABLE XIII

Future demands in rural schools.

<u>Years</u>	<u>Aggregate demand</u>	<u>Replacement</u>	<u>Increment</u>	<u>Annual demand</u>
1921	8238	1865	-212	1653
1922	8063	1819	-175	1644
1923	7888	1780	-175	1605
1924	7712	1751	-176	1575
1925	7537	1712	-175	1537

It is evident that the reliability of these forecasts grows less and less with each succeeding year.

#### B. Future demands in elementary schools:

The increase in population in the state and the shifting of this population to urban centers tend to increase the demand for elementary teachers. While the population of the state has increased 15 per cent in ten years, the enrollment of elementary pupils has increased from a total of 188,555 in 1910 to 234,340 in 1920, a change of 24 per cent. The number of elementary teachers during the same period shows a growth from 5181 in 1910 to 7272 in 1920 or 40 per cent growth. These figures show that the enrollment in elementary schools is increasing more rapidly than the general population. The increase in the number of elementary teachers has been more rapid than either the population or pupil enrollment. Table III<sup>60</sup> indicates the gradual decrease

in the ratio of pupils to teachers in number. In 1920, this ratio shows a slight increase over that of 1919. The question may be raised whether there is any considerable population of elementary school age not now in the public schools for whom provision must be made in eliminating the demand for the immediate future. The following statistics taken from tables I, III and XII are interesting in this connection.

<u>Year</u>	<u>Enrollment</u>		<u>Total</u>	<u>School population Ages 5 to 13 inclusive</u>
	<u>Rural</u>	<u>Elementary</u>		
1900	244,410	138,069	382,479	372,635
1910	221,951	188,555	410,506	434,635
1920	200,462	234,340	434,802	499,830

At first it may appear that the elementary schools are not reaching all the pupils of elementary school age. There are several facts to be kept in mind: (a) The statistics for enrollment do not include private schools. There were 24.187 elementary pupils enrolled in the private and parochial schools of Minnesota in 1917-18.<sup>61</sup> (b) Boards of education in any district may by resolution exclude all children under six years of age.<sup>62</sup> This right has been exercised in many districts by boards. (c) A limited number of pupils complete the grades before reaching the age of 14 years. It is evident then that the increase in the number of pupils will depend almost wholly on population increases in the state and in the centers maintaining schools of this class.

It will be assumed that elementary teachers will continue to increase at the present rate with a slight tendency to decrease in rate as time goes on. Table X shows that the increase of elementary teachers has averaged 3.5 per cent compounded annually for the past ten years. The increments will be reckoned on the basis of a decreasing per cent, beginning with

60. See above Table III, p 18.



3.5 per cent and reducing .1 per cent each two years. The acceptance of these per cents make it possible to compute the increments for a series of years. The formulae  $d = r / i$  and  $r = \frac{D}{a}$  have been used in computing the annual demands. The following table is a compilation of these computations.

TABLE XIV

## FUTURE DEMANDS IN ELEMENTARY SCHOOLS

Year	Aggregate demand	Replacement	Increment		Annual demand
			Per cent	Number	
1920	7272				
1921	7526	889	3.5	254	1143
1922	7789	920	3.5	263	1183
1923	8054	952	3.4	265	1217
1924	8328	985	3.4	274	1259
1925	8603	1018	3.3	275	1293

## C. Future demands in secondary schools:

The demand for secondary teachers in Minnesota has increased rapidly in the years since high schools were established in the state.<sup>63</sup> The high school enrollment of the state is drawn largely from the population 14 to 17 years of age. The degree to which high schools reach the youth of this age is shown in the following statistics:

Year	Population of secondary age 14 to 17 yrs.	High school enrollment	Ratio of population to enrollment
1900	141,105	12,802	11
1910	170,925	28,562	5.8
1920	196,472	49,060	4

61. Statistics of State School Systems 1917-18, Bulletin 1920, No.11, Department of the Interior, Bureau of Education. See Table 24, p 98.
62. See General Statutes 1913, Section 2670.
63. The State High School Board was created by legislative enactment approved March 3, 1881. This legislation marks the beginning of the high school system for the state.

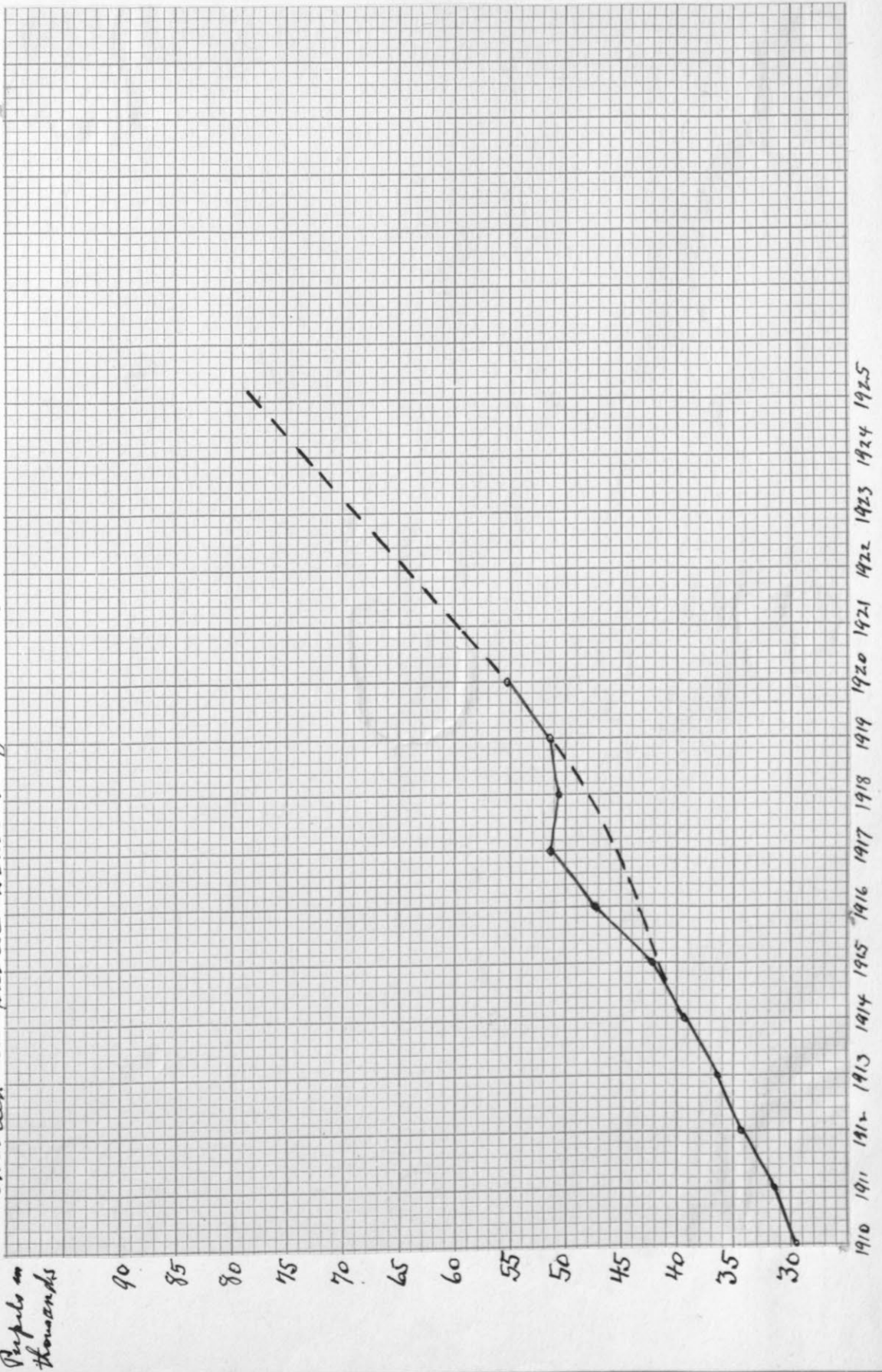
In 1900 while only one youth out of eleven of the ages from 14 to 17 years inclusive was in a high school of the state, in 1920 one out of every four attended a secondary school. It is likely that the enrollment will continue to increase at a rate much more rapid than for population. With the tendency to popularize high schools by offering diverse courses suited to the needs of the pupils, one is safe in assuming a continuation of the present rapidly rising curve of enrollment of secondary pupils.

It is a question whether the number of teachers will continue to increase at a ratio greater than for pupils enrolled. The high cost of instruction will have a tendency to prevent a further decrease in the average enrollment per teacher. In fact in 1920 there was a small increase in the ratio of pupils enrolled per teacher.<sup>64</sup>

The estimated future demand will be based upon the trend of the enrollments of secondary pupils as shown by statistics for the past ten years. Diagram 2, shows the plotting of these data and the projected curve.

64. See above, Table V, p 21.

Diagram 2.  
 Plotted and projected curve, showing number secondary pupils  
 enrolled in public schools of Minnesota.



The aggregate number of teachers for the successive years has been computed on the basis of one teacher for 15.8 pupils, this being the ratio of pupils to teachers for the year 1920.

TABLE XV

Forecast of enrollment of secondary pupils  
and number of teachers required  
for secondary schools

<u>Year</u>	<u>Number of pupils</u>	<u>Number of teachers basis of ratio 1 to 15.8</u>
1921	60,000	3,797
1922	64,400	4,076
1923	68,750	4,351
1924	73,500	4,652
1925	77,750	4,921

The number of teachers for any year is the aggregate demand for that year. We have therefore a forecast of the aggregate demands for the years 1920 to 1925. Again using the formula  $r = \frac{D}{a}$ , the replacement for any year can be found since D and a are known quantities. This gives a basis for the following table, showing in addition to the aggregate demand, replacement, increment and annual demand for the successive years.

TABLE XVI

Future demands in secondary schools

<u>Year</u>	<u>Aggregate demand</u>	<u>Replacement</u>	<u>Increment</u>	<u>Annual demand</u>
1920	3527			
1921	3797	555	270	825
1922	4076	597	279	876
1923	4351	641	275	916
1924	4652	684	301	985
1925	4921	731	269	1000

## PART II

THE SUPPLY OF TRAINED TEACHERS

- - - -

## CHAPTER V.

## THE SUPPLY IN GENERAL

We turn now to a consideration of the supply of teachers for the schools of Minnesota. There is need not only for teachers but for trained teachers. What should be the standards of training that the supply should meet? In an ideal way it may be said that the supply should be trained to the highest degree of efficiency for which local communities can pay. This would mean many standards and in many cases very low standards. In Minnesota, certain common minimum standards have been established for the different classes of schools as a condition of sharing in the special state aid. In every case, the training of the teacher is prescribed. This leads to a statement of the first principle.

Principle 1. The supply of teachers for the state of Minnesota should be trained to meet the established standards of the state.

The institutions training rural school teachers should offer courses of such character and duration as will prepare the graduate to at least qualify as a teacher under the minimum requirements demanded by the state. The same may be said of institutions training elementary and secondary teachers. Minnesota's standards for teachers are established, (1) by the statutes of the state and (2) by the rules of the State Board of Education, which define in detail the requirements for schools of different classes. The legislature of 1913 enacted certain laws, the effect of which was to define more clearly the qualifications for teachers and to demand professional training for all candidates for a

license to teach. Two quotations are given from the law.

Qualified teacher - "A qualified teacher is one holding a certificate or license to teach, as hereinafter provided, in the school or grade for which he is employed. Contracts for teaching can only be made with qualified teachers. Contracts made with persons before obtaining such certificates or licenses shall only be valid from the time of obtaining the proper certificate or license".<sup>65</sup>

Professional training - "From and after August 1, 1915, all candidates for teachers' certificates by examination, renewal or endorsement of credentials, except those who have taught successfully for at least eighteen months in the public schools prior to such date, or those receiving either a second grade or a limited certificate, must have completed such a course of professional training for teaching not exceeding thirty six weeks, as may be prescribed by the State Superintendent".

"Training courses in the state university, in state normal schools, in state high schools, or in private schools fully and fairly equivalent of those given in state schools and approved by the said superintendent shall be accepted as meeting the requirements for teachers training under this section".<sup>66</sup>

The distribution of the special state aid funds is made by the State Board of Education. State aid funds are legally designated the "Annual Fund".<sup>67</sup> The authority of the State Board to establish rules and fix standards is stated as follows: "The State Board of Education shall distribute the annual funds and any other sums appropriated by the state to schools, and libraries in such manner and upon such conditions as will enable them to perform efficiently the

65. General Statutes of 1913, Section 2829.

66. General Statutes of 1913, Section 2864.

67. Laws of 1915, Chapter 296, Section 1.

services required by law and to further the educational interests of the state".<sup>68</sup>

Under authority of this law standards have been established for every class of schools. At this point in our study, our concern is in the standards of training for teachers of the different classes of schools. The professional and educational requirements will be set forth for the three groups of schools, rural, elementary and secondary.

1. Rural schools - Two subventions are provided for rural schools. The first subvention requires a teacher holding a first class certificate, and an eight months' session; the second subvention is provided for a teacher holding a second class certificate, and seven months' school.<sup>69</sup>

State aided schools are thus required to have teachers with either first class or second class certificates. There are limited certificates and special certificates but these do not meet the requirements for rural aid. The following educational requirements must be met by applicants for certificates.

First class<sup>70</sup>

Educational requirement: Pass examination or offer proper credits in arithmetic, civics, English composition, geography, English grammar, U. S. history, penmanship, physiology, hygiene, reading, spelling, elementary algebra, plane geometry, elementary physics, physical geography.

Professional requirement: Any one of the following courses will be

68. Laws of 1915, Chapter 296, Section 2, Amended by Laws 1917, Chapter 287.

69. Laws of 1915, Chapter 296, Section 4.

70. Rules Relating to Common School Certificates, State of Minnesota, Department of Education Bulletin No. 46, p 7.

accepted as meeting the requirements for professional training - (a) A year's study in a training department of a state normal school or of the state agricultural schools, University Farm, Crookston or Morris, (b) graduation from a high school training department course in Minnesota, (c) graduation from a training course in a private institution. Such course must be of equal rank with that of a Minnesota high school training department and approved by the Superintendent of Education.

Second class<sup>71</sup>

Educational requirement: Same as first class except that elementary algebra, plane geometry, elementary physics and physical geography are not included in list of subjects.

Professional requirement: Same as for first class certificate.

Certificates issued on school training:

(a) A student who has completed three years of high school work, (12 credits) and who in addition has passed all the work in the training department with a standing of 75 or above, will receive a first class certificate.<sup>72</sup>

(b) A first class certificate is granted to a student who has finished one year of the advanced course of a Minnesota state normal school.

The securing of a supply of rural teachers through the examination route, is an unsatisfactory method of recruiting teachers. This method is a survival of the notion that any one could teach who had a knowledge of subject matter. The trained teachers for the rural schools are prepared in the state normal schools and the teacher training departments of the high schools. The training which meets the state's standards for rural schools is represented by

71. Rules Relating to Common School Certificates, State of Minnesota, Department of Education, Bulletin No. 46, p 8.

72. Ibid, p 9.



a high school course of four years, the fourth year being the special professional work of the teacher training department.

2. Elementary schools - "All elementary teachers in state high or graded schools must be graduates of the advanced course of a state normal school; except that graduates of approved training schools are eligible for primary and kindergarten positions if holding a special primary certificate issued by the Commissioner of Education"<sup>73</sup>

The standard then for elementary teachers is an advanced normal diploma. This represents a two year professional course in addition to high school graduation. There are two exceptions: First, teachers employed in the schools prior to September 1915, have been continued regardless of professional training. Second, on account of the shortage of teachers following the war teachers who have 16 credits (two-thirds of the advanced normal course) have been allowed by the State Board to fill temporarily elementary school positions.

3. Secondary schools - Instructors in high schools, provided they do not teach industrial subjects must hold a first grade professional certificate, (a) based on the completion of a four year academic course, including the required amount of professional training,<sup>74</sup> (b) based on examination. The number who secure professional certificates through examination is so small that they may be ignored.

Special instructors in the industrial departments are required to hold degrees in their special field, except -

(a) Instructor in manual training, who is required to have completed a two year course beyond the high school.<sup>75</sup>

(b) Instructor in commercial training who is required to have

73. Organization and Standards, Qualification and Certification of Teachers for Graded and High Schools, Department of Education, State of Minnesota August 1919, see p 7.

74. Ibid, p 6.

completed a two year professional course for teachers.<sup>76</sup>

The standard for secondary teachers is a bachelor's degree from a college or university. The exceptions to this general rule have been looked upon as temporary expedients.

Principle 2. The supply of trained teachers should be in sufficient numbers to meet the demands of the different classes of schools.

Every class of schools in the state of Minnesota, should not only be supplied with teachers but should have a supply of trained teachers. This supply should be a group of workers trained in the technique of teaching and selected on the basis of intelligence and special fitness, to receive the state's approval to teach in the public schools.

The supply of trained teachers made available each year must equal the annual demand. If the annual supply is less than the annual demand, a teacher shortage will result. Teachers inadequately trained will be employed; standards will be lowered and the efficiency of the schools will be reduced. In Chapter III, a study was made of the annual demands for the years 1910 to 1920. In Chapter IV, a forecast was made of the annual demands for the next five years. These figures are the best judgment of the probable needs of the future. The supply then, should be trained to meet the following annual demands.<sup>77</sup>

76. Ibid, p 7.

77. Annual demands taken from Table XIII, p 45, Table XIV, p 47 & Table XVI, p50.

TABLE XVII

Annual supply of trained teachers needed to meet the demands for years 1920 to 1925

<u>Year</u>	<u>Rural</u>	<u>Elementary</u>	<u>Secondary</u>	<u>Total</u>
1920	1722	1153	664	3539
1921	1653	1143	825	3621
1922	1644	1183	876	3703
1923	1605	1217	916	3738
1924	1575	1259	985	3819
1925	1537	1293	1000	3830

Principle 3. The obligation rests upon the state to train teachers to meet the established standards and in sufficient number to supply the demand of the public schools.

If education is a responsibility of the state, then schools must be maintained, compulsory attendance enforced and teachers must be trained. Provision must be made for the systematic training of teachers for the public schools. This responsibility must be met squarely by the state. Professional training schools must be publicly supported. These institutions should be organized to adequately train teachers for the specialized work of the different classes of schools.

## CHAPTER VI

THE ADEQUACY OF THE SUPPLY JUDGED BY THE  
TRAINING OF TEACHERS NOW IN THE SERVICE.

In the preceding chapter the need for trained teachers was discussed. The principle was established that the supply of teachers should be trained to meet established standards.<sup>78</sup> It was assumed that the minimum training acceptable for teachers should be the requirement for state aid in the different classes of schools. In general it was pointed out, (a) that rural teachers qualifying for state aid must hold either a first or second class certificate with a year of professional work in a teacher training department or a normal school, (b) that elementary teachers in graded or high school system should be advanced normal graduates and (c) that secondary teachers should hold first grade professional certificates based on the completion of a four year college course, or its equivalent, with required professional work. In the case of manual training and commercial teachers an exception is made from the regular standard for secondary teachers, a two year course beyond high school being accepted.

The school year of 1920-21 is the sixth since the present professional standards for teachers were authorized by statute.<sup>79</sup> During this time over one-half of the teachers employed in the schools have been replaced by new recruits in the teaching profession.<sup>80</sup> To what degree do the teachers in the service meet the minimum requirements for training? What is the adequacy of

78. See Principle 1, Chapter V, p 51.

79. See above, Chapter V, p 51.

80. The median service for elementary teachers is 4.86 years and for secondary teachers 3.56 years. See pages 33 and 37.

the supply judged by the training of teachers in the service? The questions will be answered in respect to the three classes of teachers, rural, elementary and secondary.

A. Adequacy of trained rural teachers in the service:

The questionnaire sent to the eighty six county superintendents of the state on December 20, 1920,<sup>81</sup> asked specific information concerning the qualifications of teachers employed in the rural schools of the counties. A reference to the questionnaire form shows that the certificates held were to be reported under one of seven heads:

1. State normal diplomas,
2. Regular first class certificates,
3. Regular second class certificates,
4. Regular limited,
5. Special one year first class on credentials,
6. Special second class certificates,
7. Special limited, (permit).

Replies were received from eighty four county superintendents. No replies were obtained from Benton and Wilkin counties. Estimates have been made for these two counties. The data has been assembled in Table XVIII in six columns. The first three columns correspond in number to the first three questions of the questionnaire. Column 4 gives the sum of the replies to questions 4, 5 and 6. Column 5 corresponds to question 7.

81. See Appendix, Form 1.

TABLE XVIII

Professional Qualifications of Minnesota  
Rural Teachers 1920-21 - As Shown by Type  
of Certificate Held.

1. Number teachers holding State Normal School diplomas, (2 years).
2. Number teachers holding regular First Class Certificates.
3. Number teachers holding regular Second Class Certificates.
4. Number teachers holding Limited and Special Certificates, (not valid for aid)
5. Number teachers holding permits (not valid for state aid).
6. Total number teachers holding positions in rural schools.
7. Number of teacher training department graduates employed in schools.

County	1	2	3	4	5	6
Aitkin	4	50	45	12	27	138
Anoka	1	48	3	5	0	57
Becker	1	119	18	1	1	140
Beltrami	0	57	32	18	55	162
Benton	1	41	6	8	7	63
Big Stone	0	42	6	7	0	55
Blue Earth	2	76	21	13	3	115
Brown	0	54	9	9	7	79
Carlton	6	42	12	0	13	73
Carver	0	49	6	4	1	60
Cass	2	43	27	12	30	114
Chippewa	0	62	5	9	9	85
Chisago	0	48	8	3	2	61
Clay	1	47	29	12	3	92
Clearwater	1	35	14	10	2	62
Cook	0	4	4	6	2	16
Cottonwood	0	60	5	6	7	78
Crow Wing	1	57	10	14	10	92
Dakota	4	72	10	3	4	93
Dodge	1	68	5	2	0	76
Douglas	3	76	15	3	3	100
Faribault	1	77	23	8	6	115
Fillmore	1	113	23	13	9	159
Freeborn	0	94	16	2	15	127
Goodhue	0	124	11	6	9	150
Grant	0	39	14	3	6	62
Hennepin	6	107	3	4	2	122
Houston	0	26	43	14	8	91
Hubbard	2	28	17	5	13	65
Isanti	1	66	6	3	2	78
Itasca	10	77	13	25	9	134
Jackson	0	86	2	2	2	92
Kanabec	2	44	10	3	2	61
Kandiyohi	0	93	13	9	4	119
Kittson	0	47	15	5	12	79
Koochiching	1	23	12	20	6	62
Lac qui Parle	4	74	6	11	6	101
Lake	0	14	2	10	2	28

County	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
LeSueur	0	53	20	0	12	85
Lincoln	0	40	13	13	13	79
Lyon	0	63	11	8	5	87
McLeod	1	70	4	2	3	80
Mahnomen	1	10	8	7	9	35
Marshall	0	95	29	10	7	141
Martin	0	95	8	3	2	108
Meeker	1	77	12	0	3	93
Mille Lacs	0	60	5	3	6	74
Morrison	1	84	28	6	21	140
Mower	2	84	21	2	1	110
Murray	1	81	17	3	2	104
Nicollet	4	51	2	1	6	64
Nobles	0	74	16	5	10	105
Norman	1	51	31	10	13	106
Olmsted	8	84	13	1	8	114
Otter Tail	0	197	62	25	12	296
Pennington	0	49	16	1	5	71
Pine	0	93	18	0	8	119
Pipestone	1	53	13	1	1	69
Polk	4	114	52	20	4	194
Pope	0	50	17	7	8	82
Ramsey	4	31	0	0	0	35
Red Lake	0	35	10	5	7	57
Redwood	5	98	3	3	2	111
Renville	2	107	7	7	2	125
Rice	0	74	15	10	3	102
Rock	0	51	16	7	1	75
Roseau	0	28	27	17	26	98
St. Louis	3	137	4	11	21	176
Scott	0	47	8	5	8	68
Sherburne	2	37	6	5	0	50
Sibley	0	55	8	4	11	78
Stearns	14	122	69	9	3	217
Steele	0	64	14	12	0	90
Stevens	0	40	7	10	4	61
Swift	3	72	8	4	3	90
Todd	0	90	33	1	17	141
Traverse	0	42	6	5	3	56
Wabasha	0	72	7	8	3	90
Wadena	0	29	15	11	11	66
Waseca	0	74	16	1	4	95
Washington	0	68	3	0	0	71
Watsonwan	0	56	6	0	0	62
Wilkin	1	57	8	5	3	74
Winona	8	35	15	15	6	79
Wright	0	77	12	12	5	106
Yellow Medicine	0	63	13	4	14	94

Total . . . . . 123 . . . . 5571 . . . . 1271 . . . . 599 . . . . 615 . . . . 8179

Total number of high school training department graduates reported  
from all counties . . . . . 3871

Out of a total of 8179 teachers actually employed in the rural schools, 123 are advanced normal graduates. Of the 5571 first grade teachers, 3871 are graduates of the high school training departments. The training department graduates constitute 69 per cent of the number of first class teachers and 47 per cent of the total number of rural teachers. While the state normal schools furnish some training to a large number of rural teachers, it is evident that the training departments are the only institutions that are training any appreciable number of rural teachers. These departments while organized for many years, have trained less than one-half the rural teachers employed in 1920-21. There were 1271 teachers teaching on second grade certificates while 1214 teachers<sup>82</sup> held irregular certificates not valid in state aided rural schools.

It appears then, that the rural schools are not supplied with teachers adequately trained for the professional work required.

B. Adequacy of trained elementary teachers in the service:

To discover the training of elementary teachers in the service, the qualifications of over one thousand teachers were studied. For this purpose, the same selections were used as in the study of length of experience.<sup>83</sup> These were elementary teachers employed in representative schools of the state. The results are assembled in Table XIX. Column 1 gives the number of cases studied; column 2, the per cent and column 3, the total number of teachers of each case computed on the basis of the per cents for the cases studied. The statistics employed are for the year 1919-20. The total number of elementary teachers employed that year, was 7272.<sup>84</sup>

82. Sum of columns 4 and 5, Table XVIII.

83. See above, Chapter III, p 26.

84. See above, Chapter II, p 18.



TABLE XIX

Professional qualifications of Minnesota elementary teachers as shown by training.

	1	2	3
	<u>Cases</u>	<u>Per cent</u>	<u>Total number teachers</u>
Less than high school	48	5	363
High school	121	12	873
Normal (2 years)	797	79	5745
College	<u>41</u>	<u>4</u>	<u>291</u>
Total . . . . .	1007 . . . . .	100 . . . . .	7272
Numbers trained in Normals outside the state	207 . . . . .	20 . . . . .	1454

The situation in the elementary field is better than that in the rural field; still there are 1236 teachers in this field who have had only high school training or less. That is, 17 per cent of the elementary teachers do not meet present standards in professional training.

It is interesting to note that 20 per cent of the elementary teachers are trained in private institutions or institutions outside the state. No figures are available but it is likely that Minnesota is losing many teachers trained at state expense in state institutions, to other states. It is probable Minnesota loses as many as she gains.

#### C. Adequacy of trained secondary teachers in the service:

The procedure followed to determine the qualifications of secondary teachers is the same as that followed in the case of elementary teachers. The 464 cases studied were those selected for length of service.<sup>85</sup> Again the results are arranged and tabulated in the following table.

85. See above, Chapter II, p 15.

TABLE XX

Professional qualifications of Minnesota secondary teachers as shown by training.

	1	2	3
	<u>Cases</u>	<u>Per cent</u>	<u>Total number teachers</u>
High school	4	1	35
Normal (2 years)	129	28	988
College	317	68	2398
Master's degree	13	3	106
Doctor's degree	<u>1</u>	<u>...</u>	<u>...</u>
Total . . . . .	464 . . . . .	100 . . . . .	3527

If a college degree with professional training is accepted as the standard<sup>86</sup> for secondary teachers, then 1023 teachers do not measure up to the standard. This is 29 per cent of the total.

This chapter may be closed with the following conclusions relative to the qualifications of teachers serving in the different classes of schools of the state.

1. Few teachers possess more than the minimum training demanded by the position. In the rural field 123 advanced normal graduates are employed or about  $1\frac{1}{2}$  per cent of the total number of rural teachers. There are 291 college graduates in the elementary field or 4 per cent of the total number. There are 106 secondary teachers holding master's or doctor's degrees. This is 3 per cent of the total.

2. The number who do not meet the minimum requirements is large, larger than any loyal Minnesota teacher wishes were true. If the minimum train-

86. On account of difficulty in getting special teachers in manual training and commercial work, exceptions have been made for these teachers, see above, Chapter V, p 51. This fact does not lessen the desirability of maintaining a college degree as a standard for the professional qualifications of a high school teacher.

ing is graduation from a teacher-training department for rural teachers, normal school for elementary teachers and college for secondary teachers, then the following numbers fail to measure up to these standards:

	<u>Total number</u>	<u>Below standards</u>	<u>Per cent</u>
Rural teachers	8179	4185	51
Elementary teachers	7272	1236	17
Secondary teachers	3527	1023	29

3. It therefore appears that the supply is not adequate judged by the training of the workers in service.

## CHAPTER VII

The adequacy of the supply judged by the numbers trained in professional institutions.

It has been pointed out that there is, in Minnesota, an annual demand for trained teachers to supply the places of those who drop out and to provide for growth.<sup>87</sup> To meet this annual demand, the state has established professional training schools. These institutions supported and controlled by the state, annually graduate students whose diplomas carry a legal license to teach in the schools of the state. It is to these institutions that the state must look primarily for its supply of trained teachers. In addition, under certain conditions the State Department of Education is authorized to issue licenses to teach, to graduates of private schools and colleges. These private schools are a secondary source of trained teachers.

It will be the purpose in this chapter to inquire as to the number of teachers being trained annually in recognized training institutions both public and private; also, to compare this annual supply of teachers with the actual demand of the public schools of the state as was determined in Chapter III.

A table has been arranged showing the number of graduates of training institutions, who were specifically trained for the work of teaching and were granted licenses to teach. The information has been collected for the three years 1918, 1919 and 1920. The data for this table have been secured from official reports and from replies to questionnaires sent to the heads of the different training institutions.

87. See above, Chapter III, p 26.

TABLE XXI  
Annual supply of trained teachers.

	1918	1919	1920
<b>A. High school rank:</b>			
State Institutions - High school teacher-training graduates granted first grade certificates . . . . .	1121 <sup>88</sup>	962 <sup>89</sup>	911 <sup>90</sup>
Private Schools - Maintaining courses on same basis as teacher-training departments:			
Red Wing . . . . .	0	3	8
Madison Lutheran Normal . . . . .	22	21	8
Park Region Luther College . . . . .	8	3	6
Bethel Academy . . . . .	4	5	5
University Farm . . . . .	8	9	7
Crookston . . . . .	4	10	0
Total Private Schools . . . . .	46	51	34
<b>B. Normal school rank:</b>			
State Institutions: <sup>91</sup>			
Winona . . . . .	175	149	151
Mankato . . . . .	175	152	154
St. Cloud . . . . .	161	149	148
Moorhead . . . . .	107	104	92
Duluth . . . . .	75	56	53
Bemidji . . . . .	---	---	---
Total State Normals . . . . .	693	610	600
Private School:			
Minneapolis Kindergarten Association <sup>92</sup> . . . . .	73	64	56

88. Report of Inspector Minnesota State High Schools for School Year Ending July 31, 1918, pp 53 - 55.

89. Report of Inspector Minnesota State High Schools for School Year Ending July 31, 1919, pp 72 - 74.

90. Report of Inspector Minnesota State High Schools for School Year Ending June 30, 1920, pp 102 - 104.

91. Data for State Normal Schools were obtained from Normal School Records, Mr. J. M. McConnell, Secretary.

TABLE XXI - (continued)

	1918	1919	1920
C. College rank: <sup>93</sup>			
State Institutions:			
S. L. and A. College University . . .	76	119	83
Agriculture " " . . .	78	42	49
Education " " . . .	31	31	44
Total University . . . . .	185	192	176
Private Colleges: <sup>94</sup>			
Carleton . . . . .	46	40	50
Concordia . . . . .	6	7	9
Gustavus Adolphus . . . . .	24	35	38
Hamline . . . . .	17	38	30
Macalester . . . . .	24	19	42
St. Olaf . . . . .	52	52	63
St. Theresa . . . . .	11	10	13
St. Catherine . . . . .	11	16	23
Total Private Colleges . . . . .	191	217	268

This table shows the annual supply of trained teachers from the different schools, public and private. The supply is approximately as follows:

A. High school training departments:

State . . . . . 1000  
Private . . . . . 40

B. Normal Schools:

State . . . . . 650  
Private . . . . . 60

C. Colleges:

State . . . . . 180  
Private . . . . . 250

92. See Appendix, Form 2.

93. See Appendix, Form 3.

94. All the private colleges of the state which have approval for certification of graduates have been included in the list.

The high school training departments prepare teachers for work in rural schools. Normal school graduates generally enter the elementary schools. College graduates who take the educational courses usually enter the secondary schools either as teachers or administrators. The annual supply of teachers may then be compared with the annual demands.<sup>95</sup> In making this comparison the needs for 1920-21 will be compared with the approximations of the annual supply.

TABLE XXII

Relation of annual supply to annual demand  
in rural, elementary and secondary schools of  
Minnesota.

	Rural schools	Elementary schools	Secondary schools	Total
Annual demand . . . . .	1653	1143	825	3621
Annual supply:				
Trained in State Institutions . .	1000	650	180	1830
Trained in Private Schools . . . .	40	60	250	350
Total annual supply . . . . .	1040	710	430	2180
Per cent of demand provided by supply . . . . .	63	62	52	60

95. See Chapter IV, Tables XIII, XIV & XVI, pp 45, 47 & 50.

## CHAPTER VIII

## CONCLUSION

In this conclusion, the demand is shown as it exists for the school year 1920-21. With this demand is compared, the supply of trained teachers graduated from the professional schools in 1920.

THE DEMAND:

There are employed in the schools of Minnesota approximately 19500 teachers. Of these 8200 are in the rural schools, 7500 in the elementary schools and 3800 in the secondary schools. The aggregate demand for teachers is increasing rather slowly. Taking these three classes of schools, the rural teachers show a slight annual decrease in numbers. Elementary teachers have been increasing at the annual rate of  $3\frac{1}{2}$  per cent. The most rapid increase is shown in the case of secondary teachers with an annual gain of 10 per cent.

There is an annual demand for trained teachers to replace those who drop out of the work and also to provide for growth. This calls for 1650 teachers annually for the rural schools, 1150 teachers for the elementary schools and 825 teachers for the secondary schools. The total annual demand is 3625. Relative to the number of teachers employed, the annual demand is greatest in the rural school where the average length of service is shortest being 4.5 years. The next relative demand is for secondary teachers with an average length of service of 6.4 years. The least relative demand is for elementary teachers whose service averages 8 years.

THE SUPPLY:

Judged by the training of teachers now in the service it is evident the supply of trained teachers has not been adequate in the years gone by. Over



1200 rural teachers or 15 per cent of the total number hold irregular certificates and can not meet the requirement for state aid. One-half of the rural teachers are not graduates of a regular professional course in either a state normal school or a teacher-training department in a high school. In the elementary field, 1250 teachers, or 17 per cent of the total number, do not have the equivalent of a two-year normal course. In the secondary field there are over 1000 teachers who do not measure up to the standard of college training for high school work. In other words, 29 per cent of the secondary teachers do not hold degrees.

The annual supply of teachers graduating from the professional training schools of the state, both public and private, is woefully inadequate to meet the needs of the state. There are 1040 rural teachers trained annually in the training departments, 710 elementary teachers in the normal schools and 430 high school teachers in the colleges. This is Minnesota's annual supply of teachers for the schools of the different classes. In no case does the supply equal two-thirds of the demand. On the basis of all schools, the supply is 60 per cent of the total annual demand. While the demand has been increasing each year, the supply has decreased.

RECOMMENDATIONS:

1. If Minnesota is to maintain the present standards for teachers, it will be necessary to increase the output of the professional training institutions at least fifty per cent.
2. There is need for a state wide recognition of the need for an adequate supply of teachers trained to meet the demands of Minnesota. The state's responsibility should be recognized by tax payers and law makers as well as educational leaders.

APPENDIX

Form 1. - Questionnaire sent to Minnesota County Superintendents.

December 29, 1920.

To the County Superintendent of \_\_\_\_\_ County:

The Department of Education desires to gather some data as to the teacher situation in the rural schools of the state and I will kindly ask you to answer to the best of your knowledge the questions asked below and return this sheet properly filled out not later than January 10, 1921.

Make as accurate a report as possible from the records in your office.

Teachers Employed Holding:

1. State Normal Diplomas (2 years) . . . . . \_\_\_\_\_
2. Regular First Class Certificates . . . . . \_\_\_\_\_
3. Regular Second Class Certificates . . . . . \_\_\_\_\_
4. Regular Limited (not special) . . . . . \_\_\_\_\_
5. Special One Year First Class Certificate on Credentials \_\_\_\_\_
6. Special Second Class Certificates . . . . . \_\_\_\_\_
7. Special Limited Certificates (permits) . . . . . \_\_\_\_\_
8. Total . . . . . \_\_\_\_\_
9. Number of positions in your county not filled . . . . . \_\_\_\_\_
10. Number of teacher-training graduates teaching in  
your county this year . . . . . \_\_\_\_\_
11. How many teachers working in the rural schools of your  
county are teaching in regular positions for the  
first time this year . . . . . \_\_\_\_\_

\_\_\_\_\_  
County Superintendent

\_\_\_\_\_  
County.

APPENDIX

Form 2. - Letter addressed to Minneapolis Kindergarten Association.

April 4, 1921.

Miss Stella S. Wood,  
Minneapolis Kindergarten  
Association Normal School,  
Minneapolis, Minn.

My dear Miss Wood:-

In making a study of the training and supply of elementary teachers in the state of Minnesota, I am desirous of finding out how many graduates from the training schools of the state enter the teaching profession. May I trouble you to supply the following information:

	<u>1918</u>	<u>1919</u>	<u>1920</u>
1. Number of graduates of Minneapolis Kindergarten Association Normal School . . . . .			
2. Number of graduates who have entered the work of teaching . . . . .			

I am asking for the information for three classes. Under the second question I wish the number who entered teaching and not the number now teaching.

I enclose a stamped envelope for your convenience in replying.

Thanking you in advance for the information, I am,

Yours truly,

APPENDIX

Form 3. - Questionnaire sent to all colleges of the state whose graduates are recognized for certificate purposes.

September 20, 1920.

Dear Sir:-

I am making a study of the source of supply of secondary teachers for the state of Minnesota. May I trouble you for the following information:

	<u>1918</u>	<u>1919</u>	<u>1920</u>
1. Number of graduates of:			
College of Science, Literature and Arts . . . . .			
College of Agriculture, Forestry and Home Economics . . . . .			
College of Education . . . . .			
2. Number of graduates who have been issued University of Minnesota certificates:			
	<u>1918</u>	<u>1919</u>	<u>1920</u>
College of Science, Literature and Arts . . . . .			
College of Agriculture, Forestry and Home Economics . . . . .			
College of Education . . . . .			

I am assuming that candidates for teachers' certificates are graduated from these three colleges. If any other college prepares teachers I should be glad to have them included.

Thanking you for the information, I am,

Yours truly,

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