# A G R I C U L T U R A L  E D U C A T I O N

# I N  A  S E C O N D A R Y  S C H O O L

******************

## "THE MINNESOTA PLAN"

S T U R G I S S  B R O W N  D A V I S, M.A.

O H I O  S T A T E  U N I V E R S I T Y

1 9 1 2

# I N D E X

---oOo----

# I N T R O D U C T I O N

**********

Though agriculture is one of the primitive occupations of man, scientific instructions in agriculture is the most recent attempt of the rural American high school.

The present tendencies of the economic and social conditions in the United States point to the wisdom of giving attention to vocational training in the secondary division of the public schools. In this land of democratic institutions, and universal education, a selection of vocational subjects for the school curriculum is a serious matter for consideration. Agriculture however, is recognized as a basic industry and instructions in the elemental principles of the subject involves a wise outlay of public funds, especially in rural communities.

Several types of secondary agricultural schools have been established throughout the country with varying degrees of success, but the whole scheme of secondary training in agriculture is still in the experimental stage.

It is the purpose of this thesis to show that the Minnesota Plan of agricultural instruction as established in the system of State high schools there, is the most efficient and economical plan yet tried. It is a compromise between the strictly vocational school and the American cultural high school. The plan has met with phenomenal success in Minnesota and is referred to by various State agricultural commissions

in most commendable terms. An agricultural high school in Minnesota means a regularly established high school in which vocational training in agriculture is made an integral part of the secondary training and coordinate in efficiency with all other departments. The development, present results and future tendencies of these agricultural high schools, and the advantages of the Minnesota Plan over the other types of agricultural schools are discussed in this thesis.

The data for this thesis is based largely upon a questionaire sent out to eighty agricultural high schools in the State of Minnesota. A generous response was received from about two-thirds of the schools, and to many special teachers of agriculture and school superintendents of the State, the writer owes a debt of gratitude for the careful replies to the questions.

From the annual reports of the State High School Inspector, Geo. B. Aiton and Bulletins 25 and 35 published by the State Department of Public Instruction, much valuable information was found which appears verbatim in the Appendix or in indirect quotations wherever applicable. Numerous bulletins, catalogs of agricultural schools, reports of the State Agricultural Commissions have been consulted to compare the Minnesota Plan with the other types now being tried out in the various parts of the country.

The writer made a number of personal visits to the agricultural high schools herein described, and the information given in this thesis is as near accurate as could be obtained.

Should this thesis be consulted by school officers interested in the Minnesota Plan, no fonder wish is cherished than that the data herein given may serve as a suggestive guide in securing immediate, definite results and avoiding the errors already committed by those who are blazing the way. Any information regarding Secondary Education in agriculture should be received as suggestive for the whole scheme is too new to offer much that is final.

# D E V E L O P M E N T  O F  M I N N E S O T A  P L A N

*************************

The establishment of Agricultural High Schools is a direct response to a demand from the people. Bankers' Associations, Commercial Clubs, Industrial and Educational Societies in the past few years have made serious inquiry into the efficiency of our public high school. Well might the inquiry be made for only a small percent of boys ever entered the high school and of those who did, less completed the course. In general, neither parents nor students were attracted to the institution. It was conceded to be a worthy institution, but far from being essential or helpful for the average business life. It simply had not kept abreast with the demands of the times. The course of instruction was too academic and based upon college entrance requirements. Except for those who went on to college it was felt that the high school course was not a "preparation for complete living" in any marked degree. Especially was this observation applicable to the rural high school. The young people were educated away from the farm which is the basis of our food supply. The course of instruction and the manner of its presentation, and above all, the personnel of the teaching force, stimulated graduates to prepare for some professional career or to enter some line of business in the city. Such instruction has no mission when the movement of population is already to the overcrowded city. For some time there have been too many young people seeking clerical positions, and an over supply of men in the so called learned professions. The best brains and brawn are not

attracted to the farm simply because of a lack of knowledge of the real apportunities country life affords to those who know and can.

To many well intended high school teachers their work consisted in drilling pupils in the wisdom of the ancients. It was gracefully conceded that most of the knowledge and skill acquired in the high school might be forgotten but that a mental discipline and culture was gained through a study of mathematics and languages that would give power to cope with any situation in later life, to a far better advantage than the facts of the case warrant.

This theory of formal discipline has been so seriously questioned of late years that thinking educators began to revise the course of study in response to a popular demand.

The elective system was introduced whereby students who did not wish to prepare for college might pursue commercial subjects, English, civics, economics and such other branches as make for intelligent citizenship and social activities. These so called English and Commercial courses led to a diploma from the school and were heartily received by both parents and students. There were some few though who felt secretly that these courses were inferior to the old line studies. Perhaps they were, when poorly taught.

The next step to make our high schools mean more to our young people was the introduction of bench work for boys and sewing for girls. Perhaps no innovation was ever given a more hearty reception.

Taxpayers, educators, students and parents have alike grown in enthusiasm over this movement. Such work appeals to the constructive instinct in youth, instills a dignity for manual labor, teaches the proper use and care of tools, to say nothing of the utilitarian value of such knowledge. The supply of trained teachers for this work is not equal to the demand.

All large city systems in the United States offer the work and most village state high schools have well equipped shops. The state of North Dakota makes Manual Training a prerequisite for state aid and it is only a question of time till all other states will follow suit. Many trade high schools have been founded in large cities, but desirable as they are, such schools are not possible in the rural communities owing to lack of financial support. Since agriculture is the main occupation and source of support for the rural and village high school, it was suggested that agriculture as a scientific and vocational subject might be profitably introduced into the high school.

Most of the State Universities of the northwest were founded upon federal land grants for the establishment of agricultural colleges. The success of these agricultural colleges along side the colleges of art, medicine, law, engineering and other technical schools has revealed their strength for personal and public welfare. If as President Harper used to say, the high school is the people's college, the question arose, why not introduce agriculture into the high school as a department just as the college of agriculture is a department of the State University?.

For years previous to 1908 agriculture had been taught as a vocational subject in secondary schools of various types including private, institutions, congressional district agricultural schools, county agricultural schools, and secondary agricultural schools under the direction of the State Universities. There were many high schools which offered instruction in agriculture but the teachers were not well prepared for the work and as a result the instruction was bookish. It is only since 1908 that the Agricultural high school has had any definite meaning. In that year two State high schools, one at Albert Lea, and the other at Canby, Minnesota, each introduced agriculture into their courses of study. It was an experiment, the object being to determine whether a regular high school course would be a suitable place into which the study of agriculture should be introduced.

The instruction given was by trained teachers and the results of the work justified its continuation.

See Appendix page 1, "Legislation and list of Putnam Schools". A direct quotation from Bulletin 35, published by the State Department of Public Instruction, St. Paul, Minn.

# THE COURSE OF STUDY

**********

A comparison of the courses of study examined, shows that while such topics as Animal Husbandry, Soil, Crops, Weeds and Milk Testing have been studied in nearly all schools, no two have treated these subjects exactly alike. A uniform course of study for the whole state would defeat one of the very purposes of the agricultural school itself viz., to better local conditions. The great error of the past years is that entirely too much has been attempted. The field for development is so extensive and the immediate needs so evident that instructors in their eagerness have undertaken more than they could finish. The better procedure is to find out the real needs of the community and build a course of study upon that basis. All students of the four year agricultural course are expected to take Algebra, Geometry, English, History, Civics, and elect some other literary subjects to make up the major part of the course. These subjects are taken in the regular high school classes under the specialists in these branches. The most approved plan at present of giving the agricultural branches is one each year in combination with the usual high school sciences.

| ACADEMIC SUBJECTS | AGRICULTURAL SUBJECTS |
|---|---|
| First yr. Botany | Farm Crops |
| Second yr. Zoology and Physiology | Animal Husbandry |
| Third " Physics | Farm Mechanics |
| Fourth " Chemistry | Soils and Horticulture |

While these agricultural subjects are covered in a general way in all schools, specific study is made of those features of local interest. In one section it is types of dairy cattle, in another, draft horses and in another, poultry. In southern Minnesota corn has received the most attention. In northern Minnesota, potatoes and small grains.

By arranging the course of study as outlined above the student has lost nothing of cultural value and at the same time has gained a technical knowledge to aid him in gaining a livelihood from the soil. Herein lies the great argument for this type of school. The strictly trade school does not aim enough at cultural values; the classical or preparatory high school is all ideals with no technical knowledge for solving the bread and butter question.

All boys are expected to take two years of shop work, and the girls two years of domestic science. To see the interest the so called bad boy and the troublesome girl take in these industrial courses is convincing enough that we teachers have often taken the wrong procedure and blamed poor results upon the youth. Students who have had a taste of this correlation between the cultural and industrial, are not satisfied with the old form of abstract class room results. From careful inquiry along this line, it is learned that in these agricultural schools many teachers have revised their methods of presentation and the subject matter so that all their teaching aims more at a "preparation for complete living". English must include business forms and direct experience for

some specific purpose as newspaper articles, letters, etc. Caesar means more than parsing of words and translating how he moved his army a few thousand paces and camped and the same thing over the next day. Rural life, civil institutions and their bearing on our civilization are studied. The content and not the form receives the time and emphasis, and so on with the other studies. If this industrial movement does nothing more than wake up many high school teachers to the fact that much of the past kind of teaching has repelled instead of attracting bright, energetic boys, it will have served a most wholesome mission.

THE SHORT COURSE:

Nearly all schools have offered a short course of twelve weeks for the benefit of those boys and girls who feel they have outgrown the home school and are not prepared for high school work; and also for those whose circumstances compel them to help at home in the spring and fall. There is no scholastic requirement and no age limit. It is safe to say that nearly one thousand boys and girls were thus helped the past year in Minnesota. They were of all stages of advancement and ranged from adolescence to past thirty in age. Sturdy young men who can work with ease at the forge, labor hard over the pages of an elementary reader or language lesson. Most of the people drive to and from the sessions which open at 10:00 A.M. and close at 3:00 P.M., allowing time to do the home chores morning and evening. The classes are held by themselves but all the privileges of the school belong to these students also-

Sometimes a special teacher is employed at this season. If not, all teachers lend a hand from the superintendent to the cadet teachers of the Normal department which is generally found in these State high schools. The instruction is entirely applicable to the daily life of the students and includes besides the agricultural subjects; farm accounts, business forms, penmanship, spelling and civics.

In the study of farm crops the error here has been the same as in the regular courses. The teachers have attempted to cover too much ground. In the brief time at hand one or two topics is quite enough for thorough study and it should be corn or some other grain or plant of special interest to the community. The same may be said to apply to Animal Husbandry. All the time could be profitably spent on dairy cattle.

In the shop such articles are made as farm gates, pig troughs, hog racks, wagon boxes, and chicken coops. The correct names and uses of tools, their proper care and how to sharpen them is carefully developed. The forge and its possibilities is introduced. Gate hooks, welding, staples, bolt heads, tempering and the like are made. Some few schools offer a course in cement work. One school was practical enough to invite the boys to bring in their repair work. The girls take sewing and learn how to mend, darn, patch, make button holes, and the different stitches; the use of the sewing machine with its various attachments for making full suits of underware, corset covers, aprons etc.

In the cooking department the preparation of substantial food comes first. Proper food combinations and their cost. How to make nutritious, inexpensive foods into inviting digestible forms. The preparation of inexpensive cuts of meats. The proper foods for breakfast, dinner and supper. Preparation of varbohydrates and fats, flour mixtures and invalid foods.

I have mentioned these details to show that these agricultural high schools have cut out the frills and come down to the business. Certainly we are breaking away from traditions, and yet assisting earnesr students in the most helpful way.

A most pleasing feature of the Short Course is the social development. Boys and girls whose homes are remote, become acquainted and form lasting friendships. Many of the younger and advanced students enroll for a full four years' course. Others who can not do that take more than one short course.

One superintendent writes that this class of students is hungering for knowledge. It is well enough that we have attracted them to the school and fed them, on the common branches of learning to say nothing of the teaching in agriculture.

What has been said relative to the short course in bench and forge work, sewing and cooking is to a degree applicable to the regular work in these branches.

The work however, for the students enrolled in the four years agricultural course is based more on pedagogical principles and in-

cludes besides the utilitarian articles, artistic work to develop good taste. Some elegant tables and chairs have come from these shops.

Girls cut and design patterns for full dresses and make them up according to the latest approved styles. They have served full course dinners. Last spring the girls of the village high school at Winnebago, Minnesota, banqueted the Schoolmasters Club of southern Minnesota in fine style. The writer has eaten at many first class hotels where the cooking and serving did not excel the work here.

The Board of Education furnished the material and everything was prepared at the school kitchen, under the direction of the instructor in Domestic Science. Especially noticeable was the quality of the fruits and jellies which had been preserved in the fall.

# E Q U I P M E N T

*********

As may be seen in the Regulations of the High School Board, the requirements have not been burdensome to any school. Apparatus for testing milk, seeds and soil is the minimum requirement for laboratory work. The use of the chemical and physical laboratories are at the disposal of the Agricultural instructor enough of the time to fulfill his needs. Some schools report the laboratory equipment of the agricultural department costs less than one hundred dollars. Often this was made possible by the loan or gifts from machine companies. One superintendent says that three cream separator companies submitted their machines for competitive trials and were glad to have the opportunity.

Farmers, seed men, and implement dealers have often given to the schools outright or made generous reductions in price. They have felt that this agricultural education is a most worthy cause.

The land used for demonstration and experimental purposes has generally cost more than the average price of land in the community, for the school tracts are located as near to the village school as possible. Some tracts have been leased and a few have cost very little. The size ranges from three to ten acres in general, a few schools have larger. Only the larger schools have equipped their farms with buildings, stock and tools and in time these will be an integral part of the equipment.

Such a demand has been made for the State aid that it is awarded only to those schools which can fix up commodious rooms. At least two rooms are required and these shall be easy of access to both visitors and students. One room is devoted to recitations, lectures and library, and another to laboratory, seed and plant storage. Most schools have more than the minimum equipment and the kind and extent vary with the local conditions. A typical outfit for the average school is as follows:

Babcock milk tester

Tubes for physical test of soils

Soil sieves

Collections of corn, wheat, rye, barley and other small grains

Collection of weed seeds

Chart making outfit and finished charts

Seed corn tester

Cream separator

Collection of fertilizers (Commercial)

Other articles reported are:

Scales

Tuberculin test outfit

Gas engines

Stanchions

Incubators

Drills of various sorts (garden)

Cultivators

Hoes, rakes and other garden tools

The whole community should be a laboratory for the students. Owing to the meager equipment of the schools just starting, it has been necessary to make trips with the classes into the various parts of the community for observation work. Generally, the owner of a fine herd of cattle, barn of horses, yard of poultry or pen of swine, or sheep, welcome the visit of the classes. Such places have given an opportunity for study of types of animals and stock judging. Score cards are distributed to the class for judging and afterwards collected and corrected by the instructors. The class before hand is asked to observe both the inferior and commendable points in general about the farms, including such items as care of machinery, fences, gates, manure, seeds, washing of hillsides and neatness about the farm and premises.

# T H E  I N S T R U C T O R

************

More important than laboratory, equipment, building and books is the personality of the instructor himself. If ever President Garfield's saying "that a university may consist of a log with a great teacher sitting on one end and an earnest student at the other", was applicable, it is here. So much is expected and so little precedent is extant that it is a wonder that so much has already been accomplished. The scholastic preparation required by the State High School Board is very reasonable (see Appendix p. 3 ), and made so purposely owing to the scarcity of expert instructors. In practice the State High School Inspector has kindly assisted Superintendents when called upon, in the selection of agriculture instructors. In this work the practical farmer and hard headed business man can not be deceived. The results are too immediate and evident. The instructor must be a man among men, able to meet them on their own ground and advise them intelligently when advice is sought. He must be a practical workman on the farm, a good judge of live stock, and expert in experimental work. It is a part of his duties to address the farmers in public meetings and answer such reasonable questions of local importance as may arise.

It would be highly desirable that all our agriculture instructors were mature men of broad scholarship and pedagogical training, but such qualifications can not always be demanded. The public is getting ready for instructors more rapidly than our agricultural colleges can train the teachers. It is only owing to the scarcity of teachers and the high salaries they command that more agricultural departments are not already established.

A few places have been investigated where through lack of tact and immaturity of judgment, the agriculture instructor has done more harm than good to his cause. Often unacquainted with climatic and soil conditions, these men have gone among the farmers with a presumptive air and have given such impracticable and uncalled for advice that all concerned were disgusted. In such communities today the attitude towards the agricultural high school is justly indifferent.

It has been said that the high salaries now paid can not long continue, that some day when the supply is plentiful, the wage will be on a par with the average high school teacher. From the very nature of the work demanded of these men, the writer believes this prediction will never obtain. The agriculture instructor widl be paid more than the teacher of academic subjects for he does more for the community, both in the way of culture and development of its resources. A man who asks less than $1200 the first year out of college is looked up pretty carefully lest he be poorly qualified for all round work. This salary is paid to men coming from such schools as Ames, Madison, Fargo, Purdue, Champaign, St. Anthony's Park, and others of the Middle West. Some taxpayers say the salary is too much to pay inexperienced men, but if these agriculture instructors stay long enough in the community to solve a local problem, they add that much and often many times more wealth to the community, to say nothing of the improved social conditions which do not admit of a financial value.

# THE NORMAL DEPARTMENT

**********

This department is found in most of the agricultural high schools, and its purpose is to prepare teachers for the rural district school. There is a special State aid of $750 for this work. The instructor is specially qualified for the work and devotes all his time to his position. The equipment is generous and students must be mature enough to appreciate the work. So proficient is the training that the graduate of the course is granted a special certificate good for rural school work and seldom or never known to be without a position, if capable. The County Superintendents support the Normal Departments most heartily. General Elementary Agriculture is a part of the Normal course and as these students generally come from the farm, they go back among their own people more in sympathy than ever with agricultural conditions. They point the way to the agricultural high school and create sentiment for agricultural education. Often as cadet teacher in the Training Department they helped teach backwood pupils, of the Short Course.

Too often the rural school teacher is a young girl simply"waiting" till she is chosen and teaches in the country till she can get a position in some city system. She has little sympathy for country life and being poorly paid, does not give the best in her for the general uplift of the community.

## P E R S O N A L  C O M M E N T S

**********

Granting that these industrial courses are expensive and that the State of Minnesota is blessed with a generous school fund, what has been done there can be done elsewhere in our country. The Minnesota type of agricultural high school is no longer merely an experiment. A better type may in time appear but it is not yet in existence. The County and District systems are too remote from the people for intensive extension work; too distant from various local problems to get at the heart of the situation; they are also too far removed from the homes of youth who need the agricultural training the most and can not attend owing to the expense involved. Children of high school age should be under the direct care of their parents.

The social conditions of country life will be vastly improved through these rural agricultural schools as a social center. This improvement will come about gradually, but a step of progress can already be noted. The wide spread use of automobiles and the "good roads" movement which is backed up by both local and state officials and making rapid progress, will bring farmers oftener together. This step will lead also to a better social adjustment between city and country folk. The intermingling of the village youth with his equal from the farm, will develop a sympathy for each other and a realization that their occupations in life have much in common. The stale jokes and caricatures of "hayseed" from the "alfalfa zone", and the "city dude" who feels it a

disgrace to be seen in working attire, will gradually disappear and in time seem ridiculous.

Not all the youth educated in these agricultural high schools will return to the farm. It is not desirable for the welfare of the State that they all do so, for the various walks of life need the brain and brawn of the country youth. The agricultural high school is not a trade school, and is intended to prevent a social cleavage. The main point is that the graduate of these special schools will have an education that will help them to find themselves, where before our rural high schools have either repelled students or given them wrong ideas. But more will remain on the farm as they see the greater business opportunities and appreciate the independent and healthy life of the farm. It is believed too that many earnest young people will realize the social service rendered to the State in building up country life.

As the agricultural high school becomes more proficient a greater percentage of young people will attend and bring back into their homes more culture than has been known in the average rural life. The betterment of country life now advocated in political circles will not occur through politics or any sudden reformation. In a land such as this it must come through an evolution - education of the future generations in their own environment.

Two of the fifteen questions in questionaire sent out related to the "outlook for the future" and "attitude of the community towards the new agricultural department".

An inventory of the replies, leaves no doubt as to the support of the people in the most hearty way. There are a few adverse criticisms but they have a plausible explanation and can be removed under better management of the department.

Only one reports the community as "hostile". Three reported as "indifferent" and one as "hopeful".

The following quotations show what the specialists have reported as to the attitude of the people in different sections of the State

"People proud of it; hardly any one against it; could name only two individuals."

"Have only one enemy now but the Canadian thistles will soon get his farm."

"Some skeptical at first because they thought the movement a fad."

"Business men of the town and farm alike much interested."

Not a single school can be found which expects to discontinue the agricultural department. Instead the following are copied to show the future outlook:

"One of the strongest departments in time."

"Increased equipment and enrollment."

"Bright, more calls for help than we can answer."

"Expect to double the enrollment next year."

"Could not be better."

"Can see no limit to good work open for us."

There is no antagonism in Minnesota between the advocates of vocational instruction in agriculture and the teachers of academic branches. Each party realizes it has its own peculiar mission to perform. Agriculture is taught as a technical subject and, not for the cultural value though it has cultural value without doubt just as mathematics and English have vocational value.

# S U M M A R Y

*******

Scientific instruction in agriculture is the most recent undertaking of the secondary school system.

The subject has been placed in the curriculum of rural secondary schools because the people want it.

If properly managed, this movement will improve both economic and social conditions in country life.

The instructor is the most important element and upon his ability in the class room and in extension work among the farmers, will largely determine the success or failure in the community. People are getting ready for agricultural instruction faster than the agricultural colleges can prepare suitable teachers.

Though the movement is in its formative stage, the outlook for the future is most promising.

The Minnesota Plan of agricultural instruction offers many advantages of special interest.

1. Thecourse is strictly vocational in its aim, but culture is not in any way sacrificed.

2. Only one additional instructor need be added to the high school corps, if industrial training is already established.

3. Domestic Science and Manual Training are a part of the requirements for State aid in Minnesota.

4. The laboratory equipment is less expensive, for instruction in the allied sciences is given in the regular science department of the school.

5. The schools are located near the homes of students making it possible :

(a) For students to attend an agricultural school while yet under the care of their parents.

(b) To get a vocational education at the least possible expense.

(c) To assist parents at home and yet lose nothing vital in the school course.

It is a direct means through which State and federal bureaus may do extension work among the farmers.

The Minnesota Plan has the endorsement of all communities wherever thoroughly tried.

The main criticism offered by the agriculture teachers themselves is that, owing to the great amount of work to be done too much has been accomplished that could not be thoroughly done.

The extension work among farmers is yielding immediate results:

(1) Farmers' Organizations

(2) Better Live Stock

(3) Diversified farming

(4) Study of Soils

(5) Elimination of Waste

Makes all Secondary School instruction more dynamic.

# A P P E N D I X

**********

LEGISLATION AND LIST OF PUTNAM SCHOOLS:-

The legislature of Minnesota of 1909, after much discussion of the relative merits of so-called District Agricultural Schools, and agricultural courses in existing high schools, passed a law called the Putnam Act; named from its author, F. E. Putnam, of Blue Earth. This law provided for aiding each of ten schools of the state in the establishment of courses in Agriculture, Manual Training and Home Economics to the extent of $2,500 each year. The law also provided that rural districts near any of these schools might associate themselves with the central schools, for the purpose of securing the benefits of the special subjects taught under the provisions of the law.

The ten schools to be chosen as the beneficiaries under this act were, according to the law, selected by the State High School Board. This board also provided the general rules and regulations for their government.

About fifty high schools, through their representatives, made application for the aid; and, after hearing their arguments, the State High School Board selected the following:

| | | Population |
|---|---|---|
| 1. Albert Lea | High School | 6,192 |
| 2. Alexandria | High School | 3,051 |
| 3. Canby | High School | 1,505 |
| 4. Cokato | High School | 721 |
| 5. Glencoe | High School | 1,805 |
| 6. Hinckley | High School | 800 |
| 7. Lewiston | Consolidated Rural School | |
| 8. McIntosh | High School | 671 |
| 9. Red Wing | High School | 9,048 |
| 10. Wells | High School | 1,814 |

The schools were well distributed geographically, and were so chosen as to serve to test the advantages of the law for communities having varying conditions.

The schools were, without exception, successful, and great desire was awakened throughout the State to have the legislature extend like aid to a larger number of schools.

## A C T  O F  L E G I S L A T U R E  O F  1 9 1 1

****************************

With but slight changes, the legislature of 1911 re-enacted the Putnam Law of 1909, to cover twenty additional schools, to be chosen by the State High School Board.

The schools chosen, in addition to the original ten schools, are as follows:

| | | Population |
|---|---|---|
| 1. Benidji | High School | 5,099 |
| 2. Deer River | State Graded School | 482 |
| 3. Cloquet | High School | 7,031 |
| 4. Fergus Falls | High School | 6,887 |
| 5. Hector | High School | 644 |
| 6. Kasson | High School | 1,049 |
| 7. Litchfield | High School | 2,415 |
| 8. Little Falls | High School | 6,078 |
| 9. Madison | High School | 1,604 |
| 10. Milaca | High School | 1,219 |
| 11. Northfield | High School | 3,438 |
| 12. St. James | High School | 2,102 |
| 13. Sleepy Eye | High School | 2,312 |
| 14. Spring Valley | High School | 1,573 |
| 15. Thief River Falls | High School | 3,502 |
| 16. Warren | High School | 1,640 |
| 17. Westbrook | State Graded School | 460 |
| 18. Wheaton | High School | 1,346 |
| 19. Wilmar | High School | 4,040 |
| 20. Worthington | High School | 2,276 |

## S C H O O L S  U N D E R  T H E  L E E- B E N S O N  A C T

************************

Such widespread demand existed for aid for industrial work, in high schools that could not qualify under the Putnam Act, that the Legislature of 1911 passed a law giving aid to any high school or graded school, to the extent of $1,000 annually, that should provide for teaching Agriculture and either Manual Training or Home Economics. The High School Board, under this law, prescribes the qualifications of teachers of industrial subjects and the extent of the courses of study.

## R E Q U I R E M E N T S  O F  T H E  S T A T E  H I G H  S C H O O L  B O A R D  O F  M I N N E S O T A

************

### HIGH SCHOOLS RECEIVING $2,5000 AGRICULTURAL AID

1. REQUIREMENTS:

a. Each school must be listed provisionally by the State High School Board before it begins work. It at the end of the first semester it has complied with the conditions, it shall be officially designated for that year.

b. Each school shall embody the provisions of the act in:

(a) a four-year agricultural course, having special reference to

the locality in which the school is established. Agronomy and animal husbandry shall be given not less than a year each. It is desirable that botany, chemistry, zoology and physics should be given an agricultural trend, but these subjects shall not be counted as a part of the four-year course in agriculture.

(b) A general course of one year. This course shall include gardening, fruit growing, dairying and poultry raising.

(c) A winter short course of not less than three months.

2. EQUIPMENT:

This shall include at least:

a. Shop facilities for woodwork and blacksmithing.

b. Facilities for cooking and sewing. Ideal quarters including a dining room or administration room with a kitchen, laboratory on one side and a room equipped with tables and machines for sewing on the other.

c. A class room and a laboratory for the exclusive use of the agricultural department. The classroom shall be equipped with a well-arranged reference library, including bulletins, and facilities for displaying agricultural products. The laboratory shall be equipped with apparatus for testing soils, milk and seeds. The agricultural quarters shall be easily accessible to visitors or persons bringing in farm products. An outside entrance is desirable.

d. A farm building sufficient to shelter seeds, tools and children, in case the plot is remote from school building.

3. INSTRUCTORS REQUIRED:

a. The corps shall include not less than three special in-

structors, one having had training in agriculture, one in shopwork, and one in domestic science.

b. In the case of a rural consolidated shcool one of these instructors may be the principal.

c. In addition to a legal certificate, each special instructor shall hold a diploma from a reputable college of agriculture, a technical school or a permit from the secretary of the high school board.

4. NO SCHOOL SHALL RECEIVE AID to exceed two-thirds of the amount expended for outfit and instruction, the award in no case to exceed $2,500. In reckoning aid, credit shall be given for :

a. Salaries of special instructors - in case part time is devoted to this work corresponding credit shall be given.

b. Equipment, including tools and apparatus

c. Supplies, including seeds

d. Labor and team work

e. Reference books

f. Extension work in rural schools

5. NO PART OF THE FUND may be expended in purchasing ground or in erecting buildings.

# O U T L I N E  O F  C O U R S E  O F  S T U D Y  U S E D

# I N  T H E  A L B E R T  L E A,  M I N N E S O T A

# A G R I C U L T U R A L  H I G H  S C H O O L

*****************

## FOUR YEARS' COURSE IN AGRICULTURE

### FIRST YEAR

Elementary Algebra
English
Botany
Farm Crops

### SECOND YEAR

Plane Geometry
English
Zoology and Physiology
Animal Husbandry

### THIRD YEAR

Physics
English
English History
Farm Mechanics

### FOURTH YEAR

American Histiry, Civil Government
English
Chemistry
Soils and Horticulture

In addition to the work given in the above outline, Manual Training and Music are required.

Following, some of the separate courses will be outlined.

## OUTLINE OF COURSE IN PRACTICAL BOTANY

(First Year, First Semester)

1. Seeds - Their structure and germination
2. Soil - Constituents, composition, and germination
3. Root
4. Stems
5. The leaf
6. The flower
7. Fruit
8. Plant cell
9. Anatomy of stem, root and leaf
10. Composition of plants
11. Work of the roots, stems and leaves, osmosis, transpiration, absorption, photosynthesis, digestion, respiration
12. Growth
13. Reproduction

SPECIAL BOTANY OF FARM CROPS

(First Year, Second Semester)

1. Classification of Plants (Vegetable Kingdom)

| | | | |
|---|---|---|---|
| | | | Characters of Order<br>Seed and Germination<br>Roots and Hypocotyl |
| 2. | Chenopodiaceae ..... | Common Beet .....<br>Mangel Wurzell .....<br>Sugar Beet ..... | Flower<br>Varieties<br>Climate and Soil<br>Sowing, Yield and Composition |
| 3. | Cruciferae..... | Cabbage .....<br>Rohl Rabi .....<br>Turnip.....<br>Swede Turnip .....<br>Rape ..... | (Considder under same headings as family above) |
| 4. | Rosaceae ..... | Plums .....<br>Wild Plums .....<br>Apricot .....<br>Peach .....<br>Strawberries ..... | Cherries<br>Raspberry<br>Blackberry<br>Pear<br>Apple |
| 5. | Leguminosae ..... | Clovers .....<br>Alfalfa .....<br>Cow Peas .....<br>Soy Beans .....<br>Vetches ..... | Character of Order<br>Root, Stem, and Leaves<br>Seed and Germination<br>Flower, Varieties, Climate Soil<br>Sowing, Yield & Composition |
| 6. | Umbelliferа..... | Wild Parsnip.....<br>Parsnip .....<br>Wild Carrot .....<br>Carrot ..... | (Considered under same headings as Chenopodiaceae.) |

| | | | |
|---|---|---|---|
| 7. | Solanaceae ..... | Potato ..... | Seed and Seeding<br>Root<br>Stem and Tuber<br>Germination of tuber<br>Varieties<br>Climate and Soil<br>Planting, Yield & Composition |
| 8. | Compositae ..... | Thistle .....<br>Dandelions .....<br>Ox-eye Daisy ..... | Characters of Order<br>Eradication |
| 9. | Graminea (True Grasses).. | Blue Grass .....<br>Timothy .....<br>Alfalfa .....<br>Millets .....<br>Brome Grass ..... | Characters of Order<br>Root, Stem and Leaf<br>Inflorescence<br>Flower<br>Ripening<br>Seed |
| 10. | Graminae (Cereals).... | Wheat .....<br>Oats .....<br>Barley .....<br>Rye .....<br>(Buckwheat)..... | Grain<br>Roots and Tillering<br>Flower and Tillering<br>Ripening<br>Varieties<br>Climate and Soil<br>Sowing,Yield & Composition |
| 11. | Weeds of the Farm (General) ..... | | Injurious Effects<br>Duration of Weeds<br>Habit of Growth<br>How Weeds are Spread<br>Extermination |
| 12. | Weed Work (Special ..... | | Study of Individual Types (Use Herbarium)<br>Study of Seed (Use Seed Cases) |

| | | | |
|---|---|---|---|
| 13. | Farm Seed (General ) ..... | .... | Purity of Sample<br>Germinating Capacity<br>Speed of Germination<br>Weight<br>Color, Form and Odor |
| 14. | Farm Seed (Special)..... | Study of Individual .....<br>Mountings .....<br>Study of Seed .....<br>from Cases ..... | Form<br>Size<br>Color<br>Purity<br>Germinating Capacity<br>Weight |

OUTLINE OF FARM CROPS

(First Year, First Semester)

SPECIAL ATTENTION TO CORN -

History of corn plant
Acreage, distribution, production, valuation
Classification and botanical characteristics
Germination and Growth of plants
Climate and soil in its relation to corn
Selection and preparation of seed corn for planting
Care of the corn crop
Harvesting and storing of the grain
Diseases and insects attacking the corn plant
Weeds of the corn field
Composition and feeding value of corn
Corn fodder
Corn silage and the production thereof
Corn judging
Corn breeding

(Second Semester)

SMALL GRAIN

OATS .....

Selection and preparation of seed
Preparation of seed-bed
Time of seeding
Method of seeding, drilling or broad casting
Depth of seeding
Subsequent care
Harvesting, stacking and threshing
Composition and feeding value
Cost of production

| | |
|---|---|
| OATS (Continued) ..... | Diseases of the oat point<br>Treatment for the same<br>Insect enemies of the oat field and how to combat them<br>Weeds of the oat field and how to eradicate them. |

WHEAT, SPRING AND WINTER

| | |
|---|---|
| Barley ..... | (These grains are taken up under practically the same headings as the oats.) |
| Flax ..... | |
| Rye ..... | |
| Buckwheat ..... | |

GRASSES

| | |
|---|---|
| | History of grass |
| Timothy ..... | Seed |
| Blue grass ..... | Preparation of seed-bed |
| Orchard grass ..... | Sowing |
| Red top ..... | These grasses as pasture |
| Brome grass ..... | These grasses as hay |
| Meadow fescue ..... | Composition and Feeding value |
| Millets ..... | The seed crop |
| | Weeds found in these meadows and pasture |

| | |
|---|---|
| | History and distribution |
| | Climate and soil |
| Clovers..... | Seed |
| Alfalfa ..... | Time and method of seeding |
| | Legumes as a pasture |
| | Composition and feeding value |
| | Insect enemies and weeds |

Two laboratory periods a week should be given in the field as long as the weather permits, after which the same length of time should be given in the laboratory.

# A N I M A L  H U S B A N D R Y

**********

(Second Year, First Semester)

CATTEL -

Classification
Method of Judging

Beef -

Short Horns .....
Herefords .....
Aberdeen Angus .....
Galloway.....

Origin, history and development
Introduction into America
Care, feed and management of beef cattle

Dual Purpose Type -

Red Polled .....
Devon .....
Polled Durham .....
Brown Swiss .....

There should be at least two periods a week spent in stock judging, but it is sometimes difficult to get the stock without taking too much time. This is the work that is most difficult to handle.

DAIRY CATTLE -

Holsteins .....
Guernseys .....
Jerseys .....
Ayrshires .....

Points to be observed in judging and selection
Origin, history and development
Introduction into America
Care, feed and management of the dairy herd

HOGS -

Origin and domestication of swine
Classification of swine
Method of judging
Berkshire.....
Poland China .....
Duroc Jersey .....
Chester White .....
Yorkshire .....
Tamworth .....

Origin, history and development
Development in America
Feed, care and management of hogs

HORSES -

Origin, History and development of horses
Anatomy of the horse
Examination for soundness
Classification of horses
Points to be observed in judging
Points to be observed in judging breeding stock

Percherons .....
Shires .....
Belgians .....
Clydesddle .....
Thoroughbred .....

Origin, history and development
Importations into America
Feeding, caring for and handling of horses

Standard bred .....

Light and heavy harness horse
The American saddle horse

SHEEP -

Origin and domestication
Classification
Method of procedure in judging fat and breeding sheep

Leicesters .....
Lincolns .....
Cotswold .....
Shropshire .....
South Downs .....
Oxfords .....
Cheviot .....
Dorset .....
Hampshires .....

Origin, history and development
Development in America
Care, feed and management of the flock

POULTRY -

Importance of the Poultry Industry
Poultry in Minnesota
Breeds and Varieties
Selecting a Poultry Farm
Laying out a Poultry Farm
Fencing
Buildings
Feeding of Poultry
Poultry Management
Methods of Feeding Laying Fowls and Rations
Feeding Breeding Fowls
Care and Management of Turkeys
Care and Management of Ducks
Care and Management of Geese
Incubation, Natural and Artificial
Location and Construction of Incubators
Brooders and Brooding.

# M A N U A L  T R A I N I N G  E Q U I P M E N T

## F O R  B E N C H  W O R K  I N

## T H E  W O R T H I N G T O N,  M I N N E S O T A

## A G R I C U L T U R A L  H I G H  S C H O O L

**********

15 benches, each equipped with the following:

1 - rapid acting vise

4 - chisels, 1", ½", ¼" and 1/8"

1 - marking guage

1 - 6" tee square

1 - cross cut saw

1 - rip saw

1 - pannel saw

1 - two ft. rule

1 - spoke shave

1 - bench hook

1 - mallet

1 - brush

In the stock of tools for general use:

1 - Oliver saw bench

1 - 5 H.P. motor

1 - foot power morticing machine

1 - coping saw

1 - Stanley Mitre box

S P E C I M E N  C H A R T

U S E D  F O R  C L A S S  I N S T R U C T I O N

A T

W I N N E B A G O,  M I N N E S O T A  A G R I C U L T U R A L

H I G H  S C H O O L

***********

PLANT FOOD REMOVED BY CROPS IN POUNDS PER ACRE

| Crop | Gross wt. | Nitrogen | Phosphate Acid | Potash |
|---|---|---|---|---|
| Wheat | 1200 | 25 | 12.5 | 7 |
| Straw | 2000 | 10 | 7 | 28 |
| Total | | 35 | 20 | 35 |
| Oats | 1600 | 35 | 12 | 10 |
| Straw | 3000 | 15 | 6 | 35 |
| Total | | 50 | 18 | 45 |
| Corn | 65 bu. | 40 | 18 | 15 |
| Stalks | 6000 | 45 | 14 | 80 |
| Total | | 85 | 32 | 95 |
| Potatoes | 300 bu | 82 | 40 | 150 |
| Clover Hay | 4000 | — | 28 | 66 |

# L I S T  O F  L I B R A R Y  B O O K S

## USED IN MANY MINNESOTA SCHOOLS

**********

Corn - Bowman and Crosby

Corn Secrets - Holden

Wheat - Myrick

Meadows and Pasture - Wing

Alfalfa - Coburn

Cereals in America - Hunt

Clovers - Shaw

Farm Weeds - Clark and Fletcher

Feeds and Feeding - Henry

Vegetable Gardening - Greene

Live Stock Judging - Craig

Principle of Breeding-- Davenport

Types and Breeds of Farm Animals - Plum

Dairy Cattle and Milk Productions - Eckler

Farm Poultry - Watson

Manual of Farm Animals - Harper

Diseases of Animals - Mayo

Testing Milk - Woll

## L I B R A R Y  B O O K S (CONTINUED)

Swine - Dietrich

Chemistry of Plant and Animal Life - Snyder

Soils - Burkett

Soil Fertility - Vivian

The Soil - King

Farm Machinery and Motors - Davison and Chase

Encyclopedia of Agriculture - Bailey

Elements of Agriculture - Warren

Teaching of Agriculture in the High School - Bricker