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VIRGINIA POLYTECHNIC INSTITUTE

A STUDY OF EQUIPMENT FOR AGRICULTURAL HIGH SCHOOLS OF VIRGINIA

A THESIS

Submitted for the degree of

Master of Science in Agricultural Education

By

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EQUIPMENT FOR AGRICULTURAL HIGH SCHOOLS IN VIRGINIA.I. Purpose

The direct purpose of this thesis is to produce a complete list of equipment that is necessary for the Agricultural High Schools of the State of Virginia to possess in order to carry out their work in training boys in Vocational Agriculture in the most effective manner possible. The goal is to find the dividing line between that which is needed and that which is not needed, to give an instructor all that he needs to be most efficient in his work, and at the same time avoid those things that are expensive and yet not so useful. In other word, equipment that will be used most in a certain section is the equipment necessary in that section, most of the other should be eliminated.

The application of this thesis, if approved by the Agricultural Education Department of the State of Virginia, will be in the new Agricultural High Schools to be established in the future. The duty of making out this list and ordering the equipment for a new school always falls to its first instructor. As a usual thing this man is just out of college and is beginning his first year's work as an agricultural instructor. This man has little idea of the equipment necessary to make his work a success. The work is new to the local school board and it is most essential that the new man know what to recommend to the board. Without sufficient equipment the instructor may be greatly handicapped in his work; with too much the money is wasted. Or, if the wrong equipment is bought the money is lost and the instructor is at a still great-

er disadvantage. It can be seen from the above that it was logical to put a list of equipment in the hands of the instructor beginning a new school. This is what has been done, but in order to understand the recommendations that have been used in the past it is necessary to go back and briefly trace the growth and development of agriculture in the high schools of Virginia.

In order to get the money set aside by the Federal Government for the salaries of teachers, supervisors, or directors of Agricultural Education the state has to not only meet the appropriation dollar for dollar, but must also meet the requirements stipulated in the Smith-Hughes Act. One of the requirements reads as follows: "the state or local community or both, shall provide the necessary plant and equipment determined upon by the State Board, with the approval of the Federal Board for Vocational Education, as the minimum requirement for such education in schools and classes in the State." It was the duty of the state board then to make out a list of equipment which would be the minimum required in that state. This list would then be submitted to the Federal Board for approval and if adopted becomes the minimum requirement for all schools in that particular state.

Up until the establishment of agricultural schools under the Smith-Hughes Act, there had been no schools with exactly the same purpose in view as this school had. Agriculture was taught as a science and not as a vocation. In almost all the schools it was taught in connection with biology and botany. There was little or no equipment except that ordinarily used in teaching biology and botany. *Hummel in his chapter on equipment says, "There has, in the past, been too much said in commendation of going to the

rubbish pile for old tin cans, bottles, paint, pails, etc., and the use of makeshifts in carrying on agricultural work in the high schools. Agriculture requires a definite and special equipment as well as do the other sciences; and it should be provided." Adequate equipment for teaching agriculture in high schools requires a greater expenditure than does any one of the other sciences. This was one reason the teaching of agriculture in high schools developed so slowly, but the chief reason was in the purpose or aim of the agricultural course.

The first tendency toward a change in purpose came with the establishment of the Congressional High Schools in Virginia. This was also the first big step in carrying out Hummel's idea of equipment. After appropriating money for establishing these schools in each Congressional district, Virginia, a few years later, appropriated \$25,000 for building and equipment. This appropriation provided for a school farm which of course required additional equipment. The purpose of these schools was not exactly the same as the purpose of the schools under the Smith-Hughes Act. They did not have the home project idea of training a boy to farm on his own farm. Instead of this they had the boy farm on the school farm. The equipment then had a tendency to go the other extreme and too much money was put in equipment.

With the establishment of the Smith-Hughes Agricultural High School we have the purpose definitely stated by the Federal Government. The law states that in order to use the Federal Appropriation the controlling purpose of such education shall be to fit for useful employment; such education shall be of less than

college grade and be designed to meet the needs of persons over fourteen years of age who have entered upon or are preparing to enter upon the work of the farm. The equipment list then should be one that contains the necessary items to be used in an agricultural high school fulfilling the above purpose. This requirement was also based on equipment used in Congressional High Schools.

This requirement was put into effect in about 1917 in Virginia. Since this time many changes have taken place. Methods of teaching have changed. Many of the farm practices have changed. The course has become more practical for we are teaching boys to farm by allowing them to spend more time in practicing the correct methods on their own farms. Since the beginning it has been found that the different types of farming require a little different equipment in teaching the different types. For instance, it is not logical to assume that the equipment necessary in a section specializing in dairying is exactly the same as would be necessary in a trucking section. It is the purpose of the work to teach the boys to be good farmers in the section where they are going to farm; if this be true then it seems that we must have extra equipment to emphasize the type of farming predominating in the section surrounding the schools.

One other point to be considered is the fact that there may be two different kinds of high schools. First of these is the separate Agricultural school. This school always has a school farm for supervised practice and of course has to have complete equipment. Second, the department of agriculture in a high school. This kind of school would have to have special equipment for the teaching of

agriculture, but it might be possible to use the equipment of the other sciences in some cases. The latter school could be a success with a great deal less equipment than the former.

With the growth and development of the whole idea of vocational agriculture in the high school and with the many changes directly influencing the conditions controlling subject matter to be taught, it has become necessary to revise the requirements for equipment in these schools. This revision has taken place almost every year in the state of Virginia and instructors are still claiming they have material they have never used. It is almost self-evident that each year brings a need for something new in the teaching of agriculture or else we are not progressing. (In revising the requirement for equipment it is necessary to make a very careful study of all conditions that might influence the use or purpose of such equipment. Such a study should cover many points, some of the most important are: the purpose or scope of the agricultural high school; the type of farming surrounding each high school; the equipment the high school now possesses; the equipment that has been most used in the past in each section; and the development and changes in both: the field of agriculture and the methods of teaching.) These together with many other points is the study undertaken in this thesis the outcome of which should be the solution to the problem stated in the beginning; to make out a list of equipment that will answer the need of an agricultural instructor that he may do the most efficient teaching possible and at the same time not waste money in useless equipment.

II Procedure

A. Classifying Schools as to Types of Farming.

Virginia, taken as a whole, has almost every type of farming that can be thought of. Within her borders any kind of farming can be found from specialist, in bird eye beans, pecans or oysters to the best of pure bred cattle, and race ^{or} and hunting horses. From South and East where they produce early vegetables and cotton to the West where a quick maturing variety of corn has to be used in order to ripen it before frost, there are all the varieties of crops and species of domestic animals that could be expected from these two extremes. Due to many conditions, sections of the state have found it most profitable to specialize in that type of farming best suited to the conditions. There are many factors causing this wide variation in the type of farming throughout the state. One of the first of these to be considered is the Geographic position and surface features of Virginia.

Virginia lies midway between Maine and Florida in latitude 36 30' to 39 30' North and longitude 75 15' to 83 40' West. The southern line of the state from the Atlantic to the western extremity of Lee County is 450 miles; the greatest width from the North to South is 192 miles. The total land surface of the state is 40,125 sq. miles or 25,767,680 acres of land. The topography varies from low and comparatively level land on the East coast to rolling lands and foot hills of the middle section to the rough mountains of the Southwest. The following table shows the distribution of altitude within the state:

Areas in Virginia at Different Altitudes.

Feet	Sq. Miles
0-100	9,700
100-500	10,500
500-1000	5,950
1000-1500	4,700
2000-3000	6,800

Situated midway between North and South, Virginia has the characteristics of both. Covering a large area from North to South, change in altitude from the seacoast to lands over 4000 ft. above the sea coast and last, but one of the most important, her great varieties in the type of soil from the sands of the Atlantic Coast to the clays and loams of the West. These are some of the reasons why Virginia has so many types of farming.

Due mainly to elevation, distances from the Atlantic Ocean and to topography the climate of the different sections of Virginia varies as to temperature and precipitation. The annual mean temperatures range from 60.8 degrees in Northampton County to 48.5 degrees in Tazewell County. The variation in precipitation is from 34.98 inches in Shenandoah County to 49.44 inches in Wise County. The following tables show the variation in temperature and rainfall for the different sections of the state:

Counties

	Length of record-yrs.	Latest date of killing frost in spring	Earliest date of killing frost in autumn	Average length of growing season - days	Annual minimum temp.	Annual maximum temp.	Average elevation at points recorded. feet	Annual precipitation in inches	Average no. days with .01 in. or more precipitation
Culpeper	14	Apr. 14	Oct. 21	191	65.1 ⁰	45.7 ⁰	450	40.26	87
Loudon	20	" 22	" 8	170	65.8	41.6	500	39.27	97
Prince William	5	" 23	" 21	185	65	44.4	350	37.83	78
Frederick	9	" 12	" 29	200	64.4	44.4	717	38.23	96
Shenandoah	24	" 18	" 15	180	65.1	41.9	927	34.98	106
Bath	28	May 1	" 10	159	61.6	40.	2195	40.77	110
Rockingham	28	Apr. 22	" 15	176	66.2	41.6	1060	40.22	110
Campbell	45	" 28	" 27	201	66.9	46.8	681	41.75	121
Buckingham	15	" 17	" 20	186	68.2	44.	300	41.47	109
Greene	14	" 15	"	192	---	---	670	41.67	77
Albermarle	27	" 7	" 29	208	66.4	46.5	854	44.83	106
Fluvania	20	" 17	" 21	186	67	45.6	246	41.79	85
Chesterfield	15	" 8	" 24	199	---	---	130	45.55	105
Henrico	23	" 5	" 29	208	67.6	48.3	170	41.86	121
Hanover	28	" 17	" 10	187	66.9	46.2	221	42.	91
James City	20	" 9	" 29	204	67.5	47.2	70	46.43	91
King William	13	" 14	" 27	196	68.9	45.	16	42.20	90
Orange	17	" 16	" 18	186	66.7	45.3	500	46.04	110
Spotsylvania	27	" 12	" 23	193	66.7	45.2	100	42.67	112
Richmond	27	" 11	" 25	196	66.6	46.	160	41.02	88
Augusta	29	" 24	" 17	175	65.9	43.7	1380	49.33	111
Prince Edward	10	" 16	" 24	191	68.5	46.1	316	39.17	80
Elizabeth City	20	Mar. 24	Nov. 17	238	66.9	52.	5	42.70	100
Warwick	22	" 28	" 6	223	66.5	51.6	30	45.36	112
Norfolk	48	" 48	" 17	237	67.4	51.4	91	46.42	125
Princess Ann	43	" 22	" 2	245	65.1	51.6	20	41.40	119
North Hampton	6	" 27	" 8	244	68.5	49.	12	38.71	97
Surry	28	Apr. 18	Oct. 18	184	68.6	47.1	15	48.99	107
Brunswick	25	" 14	" 21	189	68.7	46.6	250	45.31	92
Montgomery	28	" 29	" 7	160	63.5	40.	2170	42.27	109
Roanoke	7	" 10	" 27	198	67.8	48.5	1000	42.32	105
Bedford	12	" 9	" 26	200	66.9	45.8	947	41.57	64
Franklin	24	" 15	" 19	191	66.7	47.3	1150	45.09	89
Pittsylvania	5	" 11	" 23	195	70.5	47.5	418	42.07	102
Charlotte	8	" 20	" 21	181	69.9	44.5	350	42.47	85
Wise	20	Apr. 25	Oct. 13	172	66.7	42.3	1966	49.44	121
Washington	14	" 20	" 17	181	--	43.5	1676	40.60	71
Tazewell	25	May 8	" 3	127	---	41.4	3250	47.95	95
Smythe	18	Apr. 25	" 10	169	65.4	41.4	2145	42.91	95
Wythe	28	" 15	" 13	182	62.4	42.0	2304	46.71	131
Lee	20	" 21	" 23	185	63.6	46.7	3243	48.46	138

These are the chief factors that cause the State of Virginia to be divided up into many sections, each specializing in the production of different farm products. There are many other factors and combinations of factors such as, market, transportation, education, etc. that may determine the particular type of farming in a section. It is impossible to ascertain the influence these minor factors have in determining the type of farming, but they must be of considerable importance, especially in a section where two or three types of farming would be practiced if it were determined only by topography, soil and climate. For this reason it is impossible to be correct in dividing the counties into farming sections based on soil, temperature, rainfall and topography. The true basis, then, would be to not only consider the conditions that ought to produce a certain type of farming, but also the amount or value of products that are actually being produced in each county. This is the basis the writer has attempted to use.

To determine the type of farming surrounding each agricultural high school the county was taken as a unit of area. This may cause an error in some cases where schools are located in a section of the county practicing a type of farming that is not typical of the county as a whole. This error will be more prevalent in large counties and in counties having a large city within its limits. In the first case, the type of farming will not vary more over a large area and, in the second case, conditions surrounding a city will often cause a different type of farming for sections of the county more distant from the city. However, this error could not be avoided as statistics for the areas within reach of high school boys going to each school are not available.

In comparing the amounts and value of farm products for each county the averages per acre, based on total number of acres, was used. It can easily be seen that the total products of one kind produced by small counties cannot be compared with the total products of large counties. After the data was placed after each county as shown in the following table, it was found that no distinct line could be drawn between sections. For example, the counties adjoining the trucking section may produce some truck, but a little more tobacco. Another may produce beef cattle, hogs, etc. and yet dairying may be the chief type of farming. For these reasons some counties will occur in both lists. After a careful study of the table number II, it was decided to divide the state up into the following sections:

I Livestock Section -

This section is supposed to include those counties in which the big part of the profit is made from the farm is gotten from the production of livestock. This livestock is almost always beef cattle with hogs and sheep as a side line. It includes many counties that are classified again under dairying and fruit counties. This group consists of counties having the following characteristics:

- A. Those averaging .015 head of beef cattle for each acre of the total farm land in the county.
- B. Producing over one ton of hay per acre (except Carroll and Grayson Counties)
- C. Producing over twenty-two bushels of corn per acre (except Carroll and Wise Counties) and a majority over twenty-five bushels of corn per acre.

total farm land and the majority under eighteen bushels. (Except

D. Producing over twelve bushels of oats per acre (except
Wise County) and majority over fifteen bushels per acre.

E. Soil of lime stone origin and grows blue grass naturally.

There are a few exceptions to the above characteristics, but when all points are considered and weighed against these few exceptions it was decided that some counties not meeting the requirements had to be placed in this group. Fifteen hundredths of a beef steer per acre may seem low, but it will be noted that all having .02 or above occur again in either Dairy or Fruit sections. Carroll and Grayson seem to be an exception to almost all rules, but when the type of soil and the rough surface of the land is considered it can be placed in no other group other than the livestock section. The large number of sheep in these counties is another point in favor of this decision. (These are the birdeye bean counties spoken of elsewhere in this paper)

II Tobacco Section - During the past five years Virginia produced on an average 144,736,000 pounds of tobacco, valued at \$39,544,000; on an average of 208,000 acres. By far the greater part of this was found to be produced in less twenty counties. These counties are almost all confined to the section East of the Blue Ridge and West of the Tidewater. The light tobacco is produced on the lighter soils lying along the North Carolina line. The dark tobacco is grown mainly on the heavier soils of the uplands of Middle Virginia and the Piedmont. This division was based on the following characteristics;

A. Those producing over eight pounds of tobacco per acre of the total farm land. (Except Louisa and Patrick Counties)

B. Those producing under twenty bushels of corn per acre of the

total farm land and the majority under eighteen bushels. (Except Bedford - twenty-one bushels)

C. Those producing less than one tone of hay per acre of the total farm land and almost all producing .85 tons or less. (Except Mathews - one ton)

D. Those having less than .015 head of beef cattle per acre of the total farm land.

III. Trucking section -

For the season 1921 - 1922 Virginia ranked third in car lot shipments of white potatoes. The potato crop of Virginia last year was valued at more than \$16,000,000. The 1920 census shows that Virginia ranks third in the production of spinach; fourth in the production of cabbage and fifth in the production of tomatoes. The total value of truck produced in Virginia in 1919 was \$55,400,097. This truck was almost all produced in a few counties around Norfolk together with two counties on the Eastern shore. To do this these counties must specialize in truck farming alone. A few counties could be selected that would stand very high in the production of truck, but for our purpose the peanut and cotton counties are included in this list, chiefly because it is not practical to have too many small districts. Conditions are very much the same and the peanuts and cotton and counties are comparatively few, although cotton growing is increasing very rapidly in this state. This district which consists of twenty-two counties were selected on the following basis:

A. Those producing over three dollars and a half worth of vegetables per acre of the total farm land.

B. Those having a long growing season - about two hundred days or over.

C. Those having a heavy rainfall - forty to fifty inches annually.

All counties in the state are included in one of these three districts. Certain counties were selected from these and placed in Dairy and Fruit sections. The Dairy section includes those counties in which there is .035 head of dairy cattle per acre of the total farm land. This is usually in a fairly good county for growing feed and is nearly always close to market; almost all the large cities in the state are surrounded by a dairy section. This often results in a dairy county whether the other factors are so favorable or not.

The fruit counties were selected on the basis of the number of bushels of fruit produced. It includes all those counties producing as much as 1.5 bushels or more per acre of the total farm land.

The following tables, made out by use of the 1920 census report, shows the data used in classifying the counties:

Willsburg	3.0	Boyer	3.0
Windsor	3.3	Castalia	1.7
Wesley	3.3	Ivy Depot	3.1
		Middletown	4.7
		Mt. Jackson	1.5
		Saw Hope	2.3
		Salem	2.3

Trucking Section	Value of truck. per acre	Dairying Section	No. dairy cows per acre
Atlee		Bridgewater	15.046
Chester	peanuts	Big Stone Gap	11.042
Courtland	"	Fincastle	14.039
Claremont	"	Mt. Jackson	8.043
Cobbs Creek	10	Salem	30.0446
Disputanna	peanuts	Culpeper	20.036
Driver	11	Floris	5.061
Eastville	106	Lincoln	1.04
Gloucester	355	Manassas	7.045
Great Bridge	32	Marshall	2.036
Mathews	10	Mathews	1.0376
Montross	3.7	Cobbs Creek	1.0376
Nassawadox	15	Poquoson	.049
Oceana	15	Varina	.058
Poquoson	8		
Syringa	5	Orchard Section	Bu. fruit per acre
Temperanceville	96	Boyce	2.0
Toana	8	Fincastle	1.7
Virina	3.3	Ivy Depot	2.1
Williamsburg	8	Middletown	4.7
Windsor	3.3	Mt. Jackson	1.5
Wakefield	peanuts	New Hope	2.2
		Salem	2.3

Livestock Section	Beef steers per acre	Tobacco Section	Lbs. tobacco per acre
Blacksburg	.041	Apple Grove	3
Big Stone Gap	.019	Appomattox	15
Burkes Garden	.059	Buckingham	11
Dublin	.056	Burkesville	14
Elk Creek	.050	Charlotte C. H.	23
Ewing	.053	Chase City	30
Lebanon	.062	Climax	26
Pearisburg	.053	Critz	6
Willis	.036	Cumberland	11
Woodlawn	.024	Dinwiddie	11
Boyce	.048	Kenbridge	26
Bridgewater	.059	Lawrenceville	14
Brownsburg	.034	Naruna	14
Fincastle	.030	New London	8
Ivy Depot	.021	Powhatan	9
Middletown	.050	Sparta	9
Mt. Jackson	.034	Tuberville	27
New Hope	.059	Whitmell	26
Salem	.015	Axton	23
Culpeper	.040		
Floris	.059		
Lincoln	.051		
Manassas	.022		
Marshall	.049		
Bedford	.019		

Counties having Agriculture High Schools.	Total acres of farm land.	Total number dairy cattle	Average no. of dairy cat- tle per acre of farm land.	Total number of beef cat- tle	Average no. of beef cat- tle per acre of farm land.	Total lbs. of tobacco- all counties over 100,000 lbs.	Average no. lbs. tob. per acre of tot. farm land.	Average value of veg. per acre of total farm land- all over \$2.00 per acre.	Average no. bu. of fruit harvested per acre of total farm land-1.5 or over.
Accomac	156,788	3,452	.02	814	.005			96.	
Albermarle	388,941	10,458	.03	8,170	.021				2.1
Appomattox	169,239	3,253	.02	791	.004	2,655,821	15		
Augusta	415,425	13,380	.032	24,656	.059				2.2
Bedford	420,455	14,515	.034	8,101	.019	564,815	8		
Botetourt	187,127	7,344	.039	5,648	.030				1.7
Brunswick	266,010	6,108	.02	1,039	.003	3,983,131	14		
Buckingham	263,225	4,851	.01	1,054	.003	2,943,057	11		
Campbell	275,677	7,039	.02	2,143	.007	3,977,583	14		
Caroline	267,444	5,644	.02	708	.002	2,426,655	9		
Carroll	278,624	9,840	.035	6,759	.024				
Clarke	97,944	2,594	.02	4,792	.048				2.0
Charlotte	265,114	6,089	.02	833	.003	5,354,511	23		
Chesterfield	172,064	4,902	.02	570	.002	253,383	2		
Culpeper	209,549	7,713	.036	8,559	.040				
Cumberland	160,399	3,262	.02	666	.004	2,792,625	11		
Dinwiddie	226,436	4,973	.02	471	.002	2,674,956	11		
Fairfax	174,183	10,641	.0611	972	.059				3.50
Fauquier	37,779	13,837	.036	16,568	.049				
Floyd	238,433	7,543	.031	8,794	.036	134,661			
Frederick	229,433	7,189	.031	14,367	.050				4.7
Giles	137,865	3,215	.02	6,815	.053				
Gloucester	92,395	2,434	.026	619	.004				3.5
Grayson	249,896	8,048	.031	12,208	.050				
Halifax	485,726	9,563	.01	3,296	.006	13,229,036	27		
Hanover	243,999	6,870	.028	964	.002	883,962	3		3.7
Henrico	114,009	6,633	.058	1,133	.009				3.3
Henry	199,232	5,015	.025	811	.004	2,536,601	23		
Isle of Wight	152,367	3,282	.0215	864					2.3
James City	50,367	1,217	.0241	163	.003				8
Lee	230,591	7,370	.0319	12,355	.053				
Lousia	221,726	5,340	.024	2,297	.010	800,444	3		
Lunenburg	190,874	4,209	.022	341	.001	4,984,074	26		
Loudoun	305,906	12,582	.04	15,789	.051				
Mathews	40,091	1,508	.0376	85	.0021				10
Mecklingburg	368,262	9,113	.0247	1,461	.003	11,355,438	30		
Montgomery	205,133	5,997	.027	8,431	.041				
Nansemond	165,936	2,158	.013	1,767	.010				11
Norfolk	103,211	3,023	.0292	892	.008				32
Northhampton	82,892	1,823	.0219	114	.001				106
Patrick	252,812	7,017	.0328	1,535	.006	1,604,543	6		
Powhatan	125,641	2,966	.0236	353	.005	1,178,663	9		
Prince George	119,032	2,021	.0168	568	.004				
Prince William	162,245	7,350	.0453	3,627	.022				
Princess Anne	94,544	2,132	.0225	661	.006				15
Pulaski	131,160	3,149	.024	7,944	.056				
Roanoke	130,089	5,811	.0446	1,025	.015				2.3
Rockingham	348,159	14,726	.0422	20,684	.059				.9
Rockbridge	260,893	7,661	.0255	8,996	.034				
Russell	292,535	7,825	.0233	18,448	.062				
Pittsylvania	582,496	12,611	.021	1,831	.003	15,726,645	26		
Shenandoah	220,984	9,540	.043	8,083	.034				2.6 1.5
Southampton	295,787	4,796	.01	2,324	.007				
Surry	87,913	1,606	.01	170	.001				
Sussex	197,553	2,024	.0102	668	.003				
Tazewell	252,247	6,234	.02	15,064	.059				
Westmoreland	122,112	2,756	.02	917	.007				3.7
Wise	72,877	3,407	.046	1,420	.019				3.4
York	38,616	1,814	.049	194	.005				8
Middlesex	68,015								5
Nottaway	12,407					1,823,349	14		

III. Present Equipment of Agricultural High Schools of the State
of Virginia.

The knowledge of the exact equipment of each agricultural high school can be of little value unless we assume that this equipment is approximately correct. The fact that these schools in the beginning bought their equipment by using the required list put out by the State Board would seem to make this information no better than a study of the list of required equipment first made out by the state. But we can assume that the schools which have been in existence for a number of years have gradually bought that equipment necessary for teaching agriculture in the section where it is located. If this is approximately correct, then it is logical to assume that a new school established in a particular section would not go far wrong in taking the average of the equipment found in several schools in that section and using this as a guide in buying equipment. Of course, this still leaves the error, if there was any, in the first list of requirements. If some of the equipment was useless or almost useless these old schools will more than likely have this equipment on hand. This error will be cared as will be shown later.

In collecting the information as to the exact equipment, the annual report of each of the sixty-five agricultural high schools of the state was obtained and this data classified, the schools of the same section being combined. As there was a different number of schools in each section no comparison could be made by using the total number of times an item occurred in one section. For example, there ^{are} is only eight schools classified as being in a

fruit section, some item of equipment necessary in a fruit section might be found in each of the eight schools and yet the same item might be found in nine of the nineteen schools in the tobacco section. This would indicate that the item was most important in the tobacco section. This would, of course, be an error as the first section would show 100% and the tobacco section less than 50%. To avoid this, the total number of schools having each item of equipment was divided by the number of schools in that section. This gives the percentage in schools in any section having each article. This was compared with the percentage in other sections and with the percentage in the state as a whole. This data for each item of equipment listed in the annual report is shown in the following table:

Best results being got by all the instructors in the state it was sent to three of the best equipped in the work in this state, Mr. E. C. McGill, formerly instructor at Blacksburg which is in the livestock section; Mr. S. J. Taylor, a former instructor at Windsor, a trucking section; and Mr. W. S. Talbot, who was instructor at ... which is in the tobacco section. These men spend a great deal of time in checking over the equipment list those articles used most and those used very little. The judgment of all three was combined and used in making out the following list of equipment which follows:

IV. How the Equipment Which is used Most was Ascertained.

As has already been stated in this paper there may be equipment in the Agricultural High Schools which is used very little and by giving a new school the average equipment of the schools in its particular section this fact would cause this useless equipment to be carried on to the new school. The only way to correct this error would be to find out from the instructors what is used and what is not used. The usual manner of doing this would be to send a questionnaire to each instructor in the state. This was not very practical for such a long list of equipment and another method of attack was used.

Instead of a questionnaire being sent to all the instructors in the state it was sent to three of the most experienced in the work in this state. Mr. E. C. Magill, formerly instructor at Blacksburg which is in the livestock section; Mr. W. S. Newman, a former instructor at Windsor, a trucking section; and Mr. Groseclose, who was instructor at *Cuckingham* which is in the tobacco section. These men spend a great deal of time in checking over the equipment list ^{for} those articles used most, and those used very little. The judgement of all three was combined and used in making out the following list of equipment which follows:

	No.	Price	State	Livestock	Dairying	Tobacco	Trucking	Fruit
Blackboards	:	:	:	:	:	:	:	:
Tables	:	:	:	:	:	:	:	:
Sinks	:	:	:	:	:	:	:	:
Storage Exhibition Cabinets	:	:	:	:	:	:	:	:
Vials	24	:	I*	:	:	:	:	:
Shovel, 12" Round Pt.	2	:	I	:	:	:	:	:
Tripod Magnifiers	6	:	1	:	:	:	:	:
Compound Microscope	1	:	II#	:	1	:	1	:
Soil Auger, 40"x1½"	1	:	1	:	:	:	:	:
Fruit jars - 1 pt.	12	:	1	:	:	:	:	:
Funnels 2½"	1	:	1	:	:	:	:	:
Funnels -6" - granite	1	:	1	:	:	:	:	:
Scales -platform with wts.	1	:	1	:	:	:	:	:
Balance - Havard Grip	1	:	1	:	:	:	:	:
Set Weights 1-1000 grams	1	:	1	:	:	:	:	:
Soil sieves 20,40,60 mesh	3	:	1	:	:	:	:	:
Soil Sieves - course	1	:	1	:	:	:	:	:
Capillary tubes-celluloid	3	:	:	:	:	:	:	:
36" sheets	:	:	1	:	:	:	:	:
Chemical Thermometers	1	:	1	:	:	:	:	:
Beakers 250 cc. aluminum	1	:	1	:	:	:	:	:
Beakers 500 cc. aluminum	1	:	1	:	:	:	:	:
Burettes	1	:	:	:	II	:	:	II
Burette clamps	1	:	:	:	II	:	:	II
Test Tube Holder	2	:	1	:	:	:	:	:
Test Tube Brushes	6	:	1	:	:	:	:	:
Corks -assorted 0-11	48	:	1	:	:	:	:	:
Evaporating dishes-large sz	3	:	:	:	:	:	:	:
Files (Rat tail)	1	:	1	:	:	:	:	:
Files (Triangular)	1	:	1	:	:	:	:	:
Forceps	3	:	1	:	:	:	:	:
Graduates - 250 cc.	2	:	1	:	:	:	:	:
Alcohol lamps - 6 oz.	6	:	1	:	:	:	:	:
Mortars - 4 oz. glass	2	:	1	:	:	:	:	:
Retort stand 3,4,&5" ring	4	:	1	:	:	:	:	:
Backcock tester, 12 bottles	1	:	:	:	II	:	:	:
Backcock tester, 4 bottles	:	:	:	:	:	:	:	:
Milk test bottles	2	:	:	:	:	:	:	:
Cream test bottles - 9 gms.	6	:	:	:	1	:	:	:
Skim milk test bottles	6	:	:	:	1	:	:	:
Dividers	2	:	1	:	:	:	:	:
Acid measure 17.6 cc.	6	:	1	:	:	:	:	:

* Necessary

Advisable

No.2.

	No.	Price	State	Livestock	Dairying	Tobacco	Trucking	Fruit
Test bottle brushes	6		I					
Milk scales, 30 lbs.	1		I					
Dairy thermometer	1		II		I			
Tactometer	1		II		I			
Pipettes	6		I					
Composite sample jar	1				I			
Spray pump-knapsack or barrel	1						Bbl.	Bbl.
Grafting chisel	1		II				1	
Pruning saws, hook bill	4		I				(6)	
pruning shears	4		I				(6)	
Pole shears	1						II	
Camera	1		II					
Incubator (small)	1		II	I				
Egg scales	1		II					
Hand duster	1		II					
Balopticon	1		II					
Lantern Slides	1		I					
Wall Charts	1		I					
Score Cards, for animals	1		I	I				
Score Cards, for grain	1		II	I				
Test Tubes	24		I					
Drawing outfit (cheap)	1		I					
Farm level	1		II					
Testing outfit for soil acidity	1		II					
<u>Construct, collect, or purchase locally</u>								
Soil bins	3		I					
Germinating trays 18x10x2"	6		I					
Germinating box	1		I					
Test Tube racks 12 tubes	2		I					
Exhibition coops	1		I					
Egg Tester	1		I					
5 yd. cheese cloth	1		I					
Window glass (germinating test)	1		I					
Pails 12 qts.	2		I					
Tool cabinet.	1		I					
Mallets	3		I					

	No.	Price	State	Livestock	Dairying	Tobacco	Trucking	Fruit
Mitre Box	1		1					
<u>Collection and exhibits</u>								
Seeds of common crops (Grains)			1					
Grasses			1					
Legumes			1					
Economic weeds			1					
Commercial fertilizers			1					
Lime in all forms			1					
Animal feeds			1					
Poultry feeds			1					
Plant disease specimens			1					
Life Hist. of Imp. insects			1					
Propogation chart			1					
Stitching Horse	1		1					
<u>Chemicals and Accessories</u>								
Paraffin			1					
Calcium sulphate			11				1	
Sulfuric acid, C.P.			1					
Sulfuric Acid-Balcock test			1					
Calcium Oride			1					
Nitric Acid			1					
Wood Alcohol			1					
Ether Alcohol			1					
Hydrochloric Acid			1					
Litmus paper - blue & red			1					
Gummed labels- 261 & 201			1					
Rubber tubing 1/4" Diam.			1					
Ammoniam hydrate			1					
<u>For Sprays and Seed Treatment</u>								
Arsenate of lead			1					
Nicotine sulphate			1					
Stone lime			1					
Copper sulphate			1					
Mercuric chlorde			1					
Flowers of sulphur			1					
Formaldehyde (40% sol.)			1					

No.4.

	No.	Price	State	Livestock	Dairying	Tobacco	Trucking	Fruit
Carbon bisulphide	:	:	1	:	:	:	:	:
Resin	:	:	1	:	:	:	:	:
Fish Oil Soap	:	:	11	:	:	:	:	1
<u>Medicines for Common Diseases</u>	:	:	:	:	:	:	:	:
Epsom Salts	:	:	1	:	:	:	:	:
Turpentine	:	:	11	1	:	:	:	:
Raw Linseed Oil	:	:	11	1	:	:	:	:
Aloes	:	:	11	1	:	:	:	:
Calomel	:	:	11	1	:	:	:	:
Blue Ointment	:	:	1	:	:	:	:	:
Vaseline	:	:	1	:	:	:	:	:
Creosote solution	:	:	1	1	:	:	:	:
Vaccine	:	:	:	1	:	:	:	:
Sodium Fluoride	:	:	1	:	:	:	:	:
Potassium Permanganate	:	:	11	1	:	:	:	:
Vaccine outfit	:	:	:	11	:	:	:	:
Emasculator	:	:	:	11	11	:	:	:
Trocar and Cannular	:	:	11	1	1	:	:	:
Bechloride Tablets	:	:	11	:	1	:	:	:
Syringe	:	:	11	:	1	:	:	:
Sweet spirits of nitre	:	:	:	:	:	:	:	:
<u>Wood Work Equipment</u>	:	:	:	:	:	:	:	:
Benches 40x10	2	:	1	:	:	:	:	:
Vises	4	:	1	:	:	:	:	:
Planes, jack 14", 2" cutter	4	:	1	:	:	:	:	:
Two-fold rules	4	:	1	:	:	:	:	:
Try square, 8" all steel	4	:	1	:	:	:	:	:
Spoke Shave	1	:	1	:	:	:	:	:
Bench brushes	2	:	1	:	:	:	:	:
Hammers, claws, and bell face	6	:	1	:	:	:	:	:
Nail sets, assorted	6	:	1	:	:	:	:	:
Oil Stones	1	:	1	:	:	:	:	:
Steel Oilers	1	:	1	:	:	:	:	:
*Mounted grindstone or emery wheel.	1	:	1	:	:	:	:	:
Marking guage	3	:	1	:	:	:	:	:
Chisels $\frac{1}{4}$ ", $\frac{1}{2}$ ", 1", 2", $\frac{3}{4}$ "	5	:	1	:	:	:	:	:
*Both ^{desirable} durable								

No.5.

	No.	Price	State	Livestock	Dairying	Tobacco	Trucking	Fruit
Counter sink, Rose	: 1	:	: 1	:	:	:	:	:
Level and Plumb	: 1	:	: 1	:	:	:	:	:
Saws, cross cut, 8 pt. 26"	: 2	:	: 1	:	:	:	:	:
Saws, cross cut, 10 pt. 24"	: 2	:	: 1	:	:	:	:	:
Saws, rip, 5 pt. 28"	: 1	:	: 1	:	:	:	:	:
Saws, rip, 6 pt. 26"	: 1	:	: 1	:	:	:	:	:
Saws, compass, 16"	: 1	:	: 1	:	:	:	:	:
Saws, back	: 1	:	: 11	:	:	:	:	:
Bit Braces 8" sweep	: 1	:	: 1	:	:	:	:	:
Bit Braces 10" Sweep	: 1	:	: 11	:	:	:	:	:
Screw Driver 8"	: 2	:	: 1	:	:	:	:	:
Wing Dividers 8"	: 1	:	: 1	:	:	:	:	:
Bevels	: 1	:	: 1	:	:	:	:	:
Scrapers	: 2	:	: 11	:	:	:	:	:
Hatchets - heavy 4 1/2"	: 2	:	: 1	:	:	:	:	:
Draw Knives 12"	: 2	:	: 1	:	:	:	:	:
Auger Bits 1/2" to 1"	: 1 set	:	: 1	:	:	:	:	:
Drill bits 1/8, 3/16, 1/4, 5/16, 3/8	: 1 set	:	: 1	:	:	:	:	:
Screw Driver Bit 3/16"	: 1	:	: 1	:	:	:	:	:
Files - Mill cut 10"	: 1	:	: 1	:	:	:	:	:
Files, tapering, triangular	: 5	:	: 1	:	:	:	:	:
File Card.	: 1	:	: 1	:	:	:	:	:
Glass cutter (Red Devil) 6wheeler	: 1	:	: 1	:	:	:	:	:
Wood files, rasp cut 10"	: 2	:	: 1	:	:	:	:	:
Smooth plane 8"	: 1	:	: 11	:	:	:	:	:
Jointer plane	: 1	:	: 11	:	:	:	:	:
Steel Squares	: 3	:	: 1	:	:	:	:	:
Saw set, hand	: 1	:	: 1	:	:	:	:	:
Adjustable auger handle	: 1	:	: 1	:	:	:	:	:
Ax	: 1	:	: 1	:	:	:	:	:
Tape 50 ft.	: 1	:	: 1	:	:	:	:	:
Putty knife	: 1	:	: 1	:	:	:	:	:
<u>Iron Work</u>	:	:	:	:	:	:	:	:
Forge	: 1	:	: 1	:	:	:	:	:
Anvils 100 - 120 lbs.	: 1	:	: 1	:	:	:	:	:
Post Dill	: 1	:	: 1	:	:	:	:	:
Hot chisel 1 1/2	: 1	:	: 1	:	:	:	:	:
Cold chisel 3/4, 1/2, 1-1/2	: 3	:	: 1	:	:	:	:	:
Swages	: 1	:	: 1	:	:	:	:	:

	No.	Price	State	Livestock	Dairying	Tobacco	Trucking	Fruit
Punches 1/4, 1/2	2	:	1	:	:	:	:	:
Hardies	2	:	1	:	:	:	:	:
Hammers 2 lbs.	1	:	1	:	:	:	:	:
Hammers 3 lbs.	1	:	11	:	:	:	:	:
Center Punches	2	:	1	:	:	:	:	:
Machinist Benches	1	:	1	:	:	:	:	:
Vises 3 1/2" jaw.	1	:	1	:	:	:	:	:
Sledges	1	:	1	:	:	:	:	:
Ball pein hammer 24 oz.	1	:	1	:	:	:	:	:
Riveting hammer 10 oz.	1	:	1	:	:	:	:	:
Tongs 1/4 and 3/8	1	:	1	:	:	:	:	:
Flat files	2	:	1	:	:	:	:	:
End Wrench Set	1	:	11	:	:	:	:	:
Pliers 8"	1	:	1	:	:	:	:	:
Set Taps & dies with stock	1	:	11	:	:	:	:	:
Drill press	1	:	11	:	:	:	:	:
Stillson wrench 12"	1	:	1	:	:	:	:	:
Jaw attachment for pipe	1	:	1	:	:	:	:	:
Stillson wrench 20"	1	:	1	:	:	:	:	:
Monkey wrench 12"	1	:	1	:	:	:	:	:
Alligator wrench 6"	1	:	1	:	:	:	:	:
Hack saw, adjustable	1	:	1	:	:	:	:	:
1 doz hack saw blades	1	:	1	:	:	:	:	:
<u>Pipe-Fitting Equipment.</u>								
Pipe cutter, one wheel	1	:	11	:	:	:	:	:
Pipe stock, taps and dies	1	:	11	:	:	:	:	:
<u>Firing Equipment</u>								
Blow torch	1	:	1	:	:	:	:	:
Copper	1	:	1	:	:	:	:	:
Wire solder with flux center	1	:	1	:	:	:	:	:
Tin snips 3"								
<u>Harness Repair</u>								
1 pkg. assorted needles	1	:	1	:	:	:	:	:
1 - 6 hole punch	1	:	1	:	:	:	:	:

	No.	Price	State	Livestock	Dairying	Tobacco	Trucking	Fruit
1 leather knife	: 1	:	: 1	:	:	:	:	:
1 side of good harness leather	: 1	:	: 1	:	:	:	:	:
1 sts. harness thread.	: 1	:	: 1	:	:	:	:	:
1 box copper rivets.	: 1	:	: 1	:	:	:	:	:
Tubular rivets	: 1 box	:	: 1	:	:	:	:	:
Riveting machine	: 1	:	: 1	:	:	:	:	:
Round Knife.	: 1	:	: 1	:	:	:	:	:
Leather gauge knife	: 1	:	: 1	:	:	:	:	:
Heller squares 1½"	: 12	:	: II	:	:	:	:	:
Harness rings	: 12	:	: II	:	:	:	:	:
Conway harness loop	: 4	:	: II	:	:	:	:	:
Assorted billet buckles	: 12	:	: 1	:	:	:	:	:
Harness buckles japanned roller)	:	:	:	:	:	:	:	:
3/4, 1, 1½,	: 6	:	: 1	:	:	:	:	:
Bell wax.	: 1	:	: 1	:	:	:	:	:
Harness snaps 1"	: 6	:	: 1	:	:	:	:	:
Sewing clamp and harness maker	: 2	:	: 1	:	:	:	:	:
Cabinet(make)	: 1	:	: 1	:	:	:	:	:
	:	:	:	:	:	:	:	:
<u>Cement Work</u>	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:
Mixing platform 10'x10' (Make)	: 1	:	: 1	:	:	:	:	:
Measur. box 1 cu.ft.sq. (Make)	: 1	:	: 1	:	:	:	:	:
Hoesur	: 1	:	: 11	:	:	:	:	:
Wheelbarrow, iron body	: 1	:	: 11	:	:	:	:	:
Plastering trowel 10'	: 1	:	: 1	:	:	:	:	:
Tampers, (Make)	: 1	:	: 1	:	:	:	:	:
Square nose shovel	: 1	:	: 11	:	:	:	:	:
Water bucket 12 qt.	: 2	:	: 11	:	:	:	:	:

Woodwork.

5 lb. wire nails, 6 d.	
5 lb. wire nails, 6 d, box	
5 lb. wire nails, 8 d.	
5 lb. wire nails, 16 d.	
5 lb. wire nails, 20 d.	
3 lb. Finish nails, 4 d.	
3 lb. Finish nails 6 d.	
3 lb. Finish nails 8 d.	
3 lb. Shingle nails	
3 lb. Lath nails	
1 pkg. brads, 7/8 inch.	
1 box carpet tacks -----total -----	\$2.10
1 gr. flat bright wood screws, No.8, 3/4 in.	
1 gr. flat bright wood screws, No. 8 1 in.	
1 gr. flat bright wood screws, No. 10, 1 1/2 in.	

No. 4-- Farm Shop Equipment.

1 gr. flat bright wood screws, No. 12, 2in.	
1 gr. flat bright wood screws, No. 12, 2 1/2 in.	
Total-----	2.14
4 doz. square hooks for tools, 2in.-----	.40
Asst.carriage bolt nuts -----	.25
Asst.steel washers -----	.10
1000 Pine, 1", varying widths, mill run - cull out -----	25.00
200 Pine, 2" x 4" -----	5.00
100 Pine, 2" x 6" -----	2.50
200 Poplar, 1/2" x 6" -- @45-----	9.00
100 Poplar, 1 1/2" varying width, @45 @-----	4.50
100 Poplar, 1" x 10" or 16 ft. -----	7.00
500 Oak, 1" x varying width -----	15.00
200 Oak, 2" x varying width -----	6.00
100 Hickory, 2" x varying width -----	3.50
3 brushes, 1 1/2 to 2 1/2 inches -----	2.00
1 gal. shellac, white -----	3.00
1 gal. paint, wagon green -----	3.00
1 gal. Linseed oil -----	
5 lbs. paste wood filler -----	.60
1 pt. glue -----	.60
1/2 gal. turpentine -----	.50

No. 9.

Iron Work.

Bolts, if no good supply locally,
Iron --

3 pieces round iron, 3/8" - 14" -----	.36
2 pieces round iron, 1/2" - 14" -----	.44
2 " flat " , 3/16"x3/4"x14' -----	.48
2 " " " , 1/4"x1"x14' -----	.56
2 " " " , 1/4"x1 1/2"x14' -----	.88
1 " " " , 1/2" x 1 1/2" x 14' -----	.86

Soldering.

1 lb. wire solder -----	.28
1 box nokarode paste -----	.30
1/2 lb. Sol ammonia (any drug store)-----	.10

<u>Agricultural Journals</u>									
Southern Planter	:	1	:	:	:	:	:	:	:
Farm Mechanics	:	1	:	:	:	:	:	:	:
Reliable Poultry Journal)	:	:	:	:	:	:	:	:	:
Southern Poultry Journal) Choice	:	1	:	:	:	:	:	:	:
American Poultry Journal)	:	:	:	:	:	:	:	:	:
Progressive Farmer	:	1	:	:	:	1	:	1	:
Breeders Gazette	:	1	:	:	1	:	:	:	:
Hoards Dairyman	:	1	:	:	:	1	:	:	:
American Fruit Grower)	:	:	:	:	:	:	:	:	:
Rural New Yorker [Choice	:	:	:	:	:	:	:	:	1
Country Gentlemen	:	:	:	11	:	:	:	:	:
Tobacco Grower	:	:	:	:	:	:	11	:	:
Swine World	:	:	:	:	II	:	II	:	:

Swine World (Both desirable
 Peanut Grower(in following schools :Chester
 Windsor
 Driver
 Courtland
 Claremond
 Wakefield

Section	65		24		19		22		13		7	
	State		General farm: ing section		Tobacco section		Trucking section		Dairying section		Fruit section	
	Total no. schools reporting yes.	% of all schools-65 reporting yes.	Total Number school reporting yes.	% of schools-24- reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of all schools reporting yes.	Total no. schools reporting yes.	% of all schools reporting yes.	Total number school reporting yes.	% of all schools reporting yes.
Camera	14	215	7	290	5	263	2	091	4	307	2	286
Measuring Tape-50'	511	785	22	916	15	789	14	636	11	846	6	858
Poultry Killing Knife	23	354	9	375	8	421	6	273	7	538	1	143
Egg Tester	20	308	8	333	7	368	5	227	6	460	2	286
Exhibition Coops	23	354	8	333	10	526	5	227	6	460	3	429
Farm Level	39	600	13	540	10	526	16	727	9	692	4	571
Stereopticon	7	108	4	166	1	052	2	091	2	154	2	286
Balopticon	15	231	7	290	2	105	6	273	3	230	3	429
Lantern Slides	15	231	5	208	2	105	8	364	2	154	2	286
Wall Charts	52	800	19	790	16	842	17	772	13	100	5	714
Plant Diseases Spec.	35	538	13	540	9	413	13	591	9	692	3	429
Mounted Spec. of Grain	33	507	15	625	11	579	7	318	9	692	4	571
" " " Grass	32	492	13	541	11	579	8	364	9	692	2	286
" " " Legumes	30	461	12	500	11	579	7	318	9	692	2	286
Life Hist. of Insects	22	338	8	333	6	315	88	362	7	538	1	143
Economic Weeds	26	400	11	458	8	421	6	273	5	385	1	143
Flowers	9	246	3	125	4	211	2	091	3	230	1	143
Test Bottle Brushes	48	738	18	750	14	737	16	727	12	923	4	571
Hydrometer Jars	41	631	15	625	13	684	13	591	8	515	4	571
Lactometers	50	769	17	708	16	842	17	772	11	846	5	714
Pipettes	58	892	23	859	17	894	18	818	13	100	6	858
Cream Scales	27	415	12	500	8	421	4	318	7	538	4	571
Composite Sample Jars	31	477	15	625	7	368	9	409	8	615	4	571
Burettes	34	523	13	540	10	526	11	500	6	460	3	429
Dairy Thermometer	52	800	18	750	16	842	18	818	12	923	5	714
Samples Com. Fert.	52	800	17	708	17	894	18	818	13	100	5	714
Samples Stock Feed	40	615	14	580	12	631	14	626	10	769	3	429
Score Card-Crop-Cattle	46	707	19	790	14	733	13	591	10	769	5	714
Flower Pots	40	615	14	583	14	737	12	545	10	769	5	714
Gas Chimneys	22	338	8	333	9	473	3	136	5	385	2	286
Glass Tumblers	38	583	11	875	12	631	15	682	9	692	4	571
Funnels--6"	40	615	17	708	12	631	11	500	10	769	4	571
Germination Boxes	33	507	12	500	12	631	9	409	8	615	4	571
Trowels	50	769	19	790	15	789	17	772	12	923	6	858
Propogation Charts	33	507	12	500	11	579	10	453	10	769	5	714
Test Tubes	57	877	20	833	18	947	19	863	12	923	6	858
WOODWORKING EQUIPMENT												
Benches	58	892	23	958	17	894	18	818	13	100	6	858
Vises	63	923	24	100	18	947	18	818	13	100	7	100
Planess	63	969	24	100	18	947	21	953	13	100	7	100
2'-two fold rules	50	769	19	790	14	737	17	772	11	846	6	858
Try Square	62	954	24	100	18	947	20	901	13	100	7	100
Sloyd Knives	25	365	9	375	7	368	9	409	5	385	2	286
Spoke Shaver	56	862	22	916	17	894	7	318	12	923	6	858
Bench Hooks	34	523	14	580	10	526	10	455	7	538	3	429
Bench Brushes	44	677	16	667	15	789	11	500	8	615	5	714
Hammers	62	954	24	100	18	947	20	909	13	100	7	100
Nail Sets	46	707	20	833	13	684	13	591	11	846	6	858
Oil Stones	61	938	23	958	17	894	21	954	13	100	7	100
Steel Oilers	46	707	20	833	12	631	14	636	11	846	7	100
Mounted Grindstones	59	907	21	875	18	947	20	909	12	923	6	858
Working Gauges	62	954	24	100	18	947	20	909	13	100	7	100
Chisels	59	907	24	100	17	894	18	818	13	100	6	858
Saw-Cross Cut	58	892	22	916	18	947	18	818	12	923	7	100
Saw, Rip	57	877	22	916	15	789	20	909	12	923	5	714
Saw, Keyhole	55	846	20	833	16	942	19	863	11	846	7	100
Saw, Back	53	815	23	958	15	789	15	882	13	100	6	858
Bit Brases	61	938	24	100	18	947	19	863	13	100	7	100
Screw Drivers	63	969	24	100	18	947	21	954	13	100	7	100

Total counties	65		24		19		22		13		7	
Section	State		Gen. Farming section		Tobacco section		Trucking section		Dairying section		Fruit section	
	Total no. schools reporting yes	Percent of all-65-reporting yes	Total number	% of schools-24-reporting yes	Total number school reporting yes	% of schools reporting yes	Total no. schools reporting yes	% of schools reporting yes	Total no. schools reporting yes	% of schools reporting yes	Total no. schools reporting yes	% of schools reporting yes
Wing Dividers	59	907	24	100	17	894	18	818	13	100	7	100
T-Bevels	56	862	21	875	17	894	18	818	12	923	6	858
CHEMICAL EQUIPMENT												
Paraffine	51	785	20	833	14	737	17	772	12	923	4	571
Parchment Paper	31	477	13	540	9	473	9	409	77	538	2	285
Sodium Carbonate	51	783	20	833	16	842	15	682	12	923	5	714
Calcium Sulphate	48	738	12	500	14	737	22	100	11	846	4	571
K Permanganate	46	707	18	750	15	789	13	591	10	769	5	714
Ammonia Hydrate	47	723	18	750	14	737	15	682	10	769	6	858
H ₂ SO ₄ C.P.	52	800	21	875	14	737	17	772	11	846	6	858
" (Babcock Test)	56	862	22	916	18	947	16	727	11	846	6	858
CaO	48	737	18	750	16	842	14	636	10	769	5	714
Calcium Sulphate	52	800	22	916	15	789	15	682	12	923	6	858
Lead Arsenate	43	661	17	708	11	579	15	682	8	615	5	714
Nitric Acid	52	800	21	875	13	684	18	818	13	100	6	858
Wood Alcohol	49	754	17	708	15	789	17	772	9	692	4	571
Grain Alcohol	13	200	7	290	2	105	4		2	154	0	---
Ether	43	661	17	708	10	526	16	727	10	769	3	429
Potassium Cyanide	44	677	15	625	12	631	17	772	10	769	4	571
Formaldehyde 40%	47	723	19	790	15	789	14	636	11	846	5	714
Calcium Carbonate	47	723	20	833	17	894	10	455	10	769	6	858
HCl	55	846	22	916	17	894	16	727	12	923	6	858
Sodium Chloride	49	754	17	708	17	894	15	682	11	846	6	858
Iron Chloride	38	584	13	540	12	631	13	591	7	538	3	429
Starch Corn	45	692	18	750	12	631	15	682	11	846	4	571
Bichloride Tablets	41	631	15	625	14	737	12	545	9	692	4	571
Silver Nitrate	42	646	16	667	14	737	13	545	11	846	6	858
Muriate of Potash	41	631	14	580	14	737	13	591	10	769	4	571
K Carbonate	37	569	13	540	11	579	13	591	9	692	5	714
Litmus Paper-red	53	815	20	833	16	842	17	772	11	846	6	858
" " -Blue	53	815	20	833	16	842	17	772	12	923	6	858
Filter Paper	50	769	20	833	16	842	14	636	11	846	6	858
Charcoal Blocks	38	584	16	617	10	526	12	545	10	769	4	571
Chloroform	34	523	14	580	10	526	10	455	8	615	3	429
Naphtalene Flakes	37	569	13	540	11	579	13	591	8	615	3	429
Vaselene	28	431	10	416	7	368	11	500	4	307	1	143
IRON WORK												
Scrapers	45	192	18	750	12	789	12	545	9	692	4	571
Hatchets	55	846	22	916	16	842	17	773	12	923	7	100
Draw Knives	60	923	24	100	16	842	20	909	13	100	7	100
Mitre Box & Saw	51	785	17	708	17	894	17	772	9	692	6	858
Auger Bits	57	877	22	916	17	894	18	818	10	769	5	714
Drill Bits	49	754	22	916	13	684	14	636	13	100	5	714
Files	50	769	21	875	13	684	18	727	13	100	6	858
Tool Cabinets	54	831	18	750	17	894	19	863	11	846	5	714
Counter Sink Rise	39	600	13	540	13	684	13	591	10	769	4	571
Level & Plumb 26"	54	831	18	750	16	842	20	909	13	100	5	714

	65 State		24 Gen. Farm. Section		19 Tobacco Section		22 Trucking Section		13 Dairying Section		6 Fruit Section	
	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.
Agr. Eng. & Farm Mechanics												
Agr. Engineering-Davidson	42	646	15	625	14	737	13	591	8	615	4	571
Agr. Drawing-French	28	431	7	290	11	579	12	545	8	615	4	571
Agr. Woodworking-Roehl	41	631	13	540	12	632	16	727	9	692	4	571
Eng. for Land Drainage-Ellicot	12	185	3	125	5	263	4	182	3	230	2	286
Farm Motors-Potter	24	369	6	250	13	591	5	227	5	385	3	429
Farm Woodwork-Roehl	39	600	12	500	13	591	14	636	7	538	2	286
Problems in Farm Woodwork-Blackburn	15	231	3	123	7	368	5	227	3	230	-	--
Practical Farm Drainage-Ellicot	9	138	2	083	5	263	2	090	1	077	1	143
Farm.Mech.-Crawshaw & Lehmann, Manual Arts Press, Peoria, Ill.)	8	123	1	042	4	210	2	090	1	077	1	143
Harness Repairing-Roehl	29	308	8	333	5	263	7	318	5	385	2	286
Farm Shop Record Book-Roehl	12	185	6	250	3	158	3	136	4	307	1	143
Farm Structures-Ekblaw	10	154	4	157	4	210	2	090	-	----	1	143
Farm Shop-Brace & Mayne	28	431	10	416	9	473	9	409	5	385	2	286
Internal Com. Eng. Cat., L.H.C.Co.	8	123	4	157	3	158	1	045	2	154	-	--
Animal Husbandry												
Farm Animals-Plumb	27	415	8	333	10	526	9	409	7	538	11	143
Animal Husbandry-Harper	28	431	8	333	10	526	10	455	4	307	1	143
Beekeeping-Franklin Phillips	17	262	5	208	4	210	8	364	2	154	1	143
Common Diseases of Farm Anim.-Craig	36	538	13	540	10	526	13	591	6	460	4	571
Diseases of Animals-Mayo	14	215	7	290	3	158	4	182	5	385	2	286
Feeds and Feeding - Henry & Morrison	37	569	13	540	14	737	110	455	6	460	3	429
Breeding Farm Animals-Munford	18	277	9	375	3	158	6	273	1	077	2	286
Breeding Farm Animals - Harper	9	138	3	123	2	105	4	182	1	077	-	----
Sheep Management- Breeds and Judging Kleinheinz	11	169	6	250	4	210	1	045	3	230	1	143
Dis. of Poultr. Pearl, Surface & Curtis	17	262	7	290	4	210	6	273	3	230	3	429
Domes. Anims. & Plants-Davenport	11	169	6	250	3	158	2	090	3	230	2	286
Essen. of Poultry Breeding	4	062	-	----	1	052	3	136	-	----	-	----
Feed Man. & Note Book-Wall	9	138	4	157	3	158	2	090	4	307	2	286
The Horse-Roberts	14	215	5	208	4	210	4	182	2	154	-	--
The Life of the Bee	7	108	3	123	2	105	2	090	3	230	1	143
Milk & Its Products	36	554	11	458	11	579	14	636	7	538	3	429
Poultry Lab. Man. & Note Book-Lewis	16	246	6	250	6	315	4	182	5	385	2	286
Productive Beekeeping Pullett	25	365	7	290	8	421	10	455	6	460	5	714
Prod. Dairying-Washburn	37	569	13	540	8	421	16	727	9	692	5	714
Prod. Feed. of Farm Animals-Wood	25	385	8	333	7	368	10	455	4	307	5	714
Productive Horse Husbandry-Gaywis	20	308	8	333	4	210	8	364	2	154	5	714
Productive Poultry Husbandry-Lewis	45	692	16	842	13	591	16	727	8	615	5	714
Productive Sheep Husbandry-Coffee	12	185	8	333	3	158	1	045	1	077	4	571
Productive Swine Husbandry-Day	43	662	15	625	13	591	15	682	7	538	7	100
Sheep Farming-Craig	24	369	8	333	10	526	6	273	4	307	3	429
Types of Breeds Of Farm Anim.-Plumb	34	523	12	800	9	473	13	591	7	538	5	714
Productive Poultry Husbandry-Lipp- incott	21	323	8	333	6	315	7	318	5	385	4	571
Beef Production*Mumford	5	077	2	083	2	105	1	045	1	077	1	143

	65 State		24 Gen. Farm. section		19 Tobacco section		22 Trucking section		13 Dairying section		6 Fruit section	
	Total no. schools-65-reporting yes.	% of schools reporting yes.	Total no. schools-24-reporting yes.	% of schools reporting yes.	Total no. schools-19-reporting yes.	% of schools reporting yes.	Total no. schools-22-reporting yes.	% of schools reporting yes.	Total no. schools-13-reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.
Applied Science												
Bact., Yeats & Molds, in the Home-Conn	14	215	4	167	4	210	6	273	2	154	3	429
Chem. of Farm Practice-Keitt	7	108	4	167	2	105	1	045	3	230	2	286
Chem. in Its Relation to Daily Life-Hart and Kalenberg	20	308	6	250	6	315	8	364	4	307	2	286
Chem. of Plant & Anm. Life-Snyder	24	369	6	250	11	579	7	318	3	230	2	286
Dairy Bacteriology-Conn	9	138	5	208	2	105	2	090	4	307	1	143
Dis. of Econ. Plants-Stevens & Hall	27	415	8	333	11	579	8	364	4	307	1	143
Farm Friends & Farm Foes-Weed	12	185	4	167	3	158	5	227	2	154	3	429
Fungi Which Cause Plant Dis.-Stevens	7	108	3	123	4	210	-	---	1	077	1	143
General Agr. Chemistry-Hart & Tottinham	13	200	2	083	7	368	5	227	3	230	1	143
Injurious Insects: How to Recognize & Control Them-O'Kane	30	462	9	375	12	631	9	405	4	307	3	429
Insect Pests for Farm Garden and Orchard-Sanderson	16	246	4	167	4	210	8	364	3	230	3	429
New Creations in Plan. Life-Harwood	17	169	3	123	7	368	7	318	1	077	1	143
The Next Generation-Jewett	27	415	9	375	13	591	5	227	6	460	3	423
Plant Breeding Bailey	27	415	9	375	9	473	9	405	4	307	4	571
Physics of Agr. - King	8	123	3	123	3	158	2	090	2	154	1	143
Preventable Diseases-Hutcheson	5	077	1	042	2	105	2	090	2	154	-	---
Principles of Breeding-Davenport	23	354	8	333	9	473	5	227	5	385	4	571
Rural Hygiene-Ogden	15	231	3	123	7	368	5	227	2	154	2	286
Rural Hygiene and Sanitation-Brewer	5	077	1	042	3	158	1	045	1	077	1	143
Sanitation of a Count. House-Bashore	8	123	3	123	3	158	2	090	3	230	3	429
Soil Phys. & Mgt.-Mesier & Gustofsen	23	354	8	333	8	421	7	318	4	307	4	571
Survival of the Unlike-Bailey	5	077	1	042	2	105	2	090	-	---	-	---
New Manual of Botany - Gray	8	123	3	123	2	105	3	136	2	154	2	286
Agricultural Chemistry-Fraps	7	108	3	123	2	105	2	090	3	230	2	236
Crops and Soils												
Productive Plant Husbandry-Davis	46	708	17	708	12	631	17	772	11	846	4	571
The Book of Alfalfa-Coeburn	23	354	9	375	7	368	5	227	6	460	3	429
Common Weeds of the Farm-Long	7	108	4	167	1	052	2	090	2	154	-	---
Corn Book-Bowman and Crossley	10	154	5	208	2	105	3	136	3	230	1	143
Corn Crop-Montgomery	21	373	8	333	5	263	8	364	3	230	3	429
Farm Grasses of the U.S.A.-Spillman	9	138	4	167	3	158	2	090	2	154	-	---
Fertility of the Land-Roberts	15	154	3	123	5	263	2	090	2	154	2	286
Farm Crops Lad. Manual-Lathrop	16	246	4	167	4	210	8	364	3	230	-	---
Productive Farm Crops-Montgomery	36	554	13	540	9	473	14	636	10	769	5	714
Cereals in America-Hunt	21	323	18	333	8	421	5	227	5	385	3	429
The Soy Bean-Piper & March	2	081	-	---	1	052	1	045	-	---	-	---
Fertilizers: Source, Character, etc) Vorhees	24	369	6	250	9	473	9	409	3	230	3	429
Forage & Fibre Crops, The-Hunt	16	246	8	333	3	158	5	227	4	307	2	286
The Potato-Gilbert	21	333	5	208	5	263	11	500	5	385	1	143
Productive Farm Crops-Lippincott	20	308	7	290	6	316	7	368	5	385	2	286
Productive Soils-Wair	14	215	6	250	3	158	5	227	3	230	2	286
Soil Fert. & Per. Agr.-Hopkins	20	308	8	333	5	263	1	318	4	307	3	429
Soils Lab. & Note Book-Eastman & Davis	21	323	8	333	7	368	6	273	6	460	1	143
Text Book of Grasses-Hitchcock	13	200	7	290	3	158	3	136	3	230	2	286
Principles of Plant Culture-Goff	18	277	7	290	7	368	4	182	5	385	-	---
Spraying Crops - Weed	8	123	3	123	5	263	-	---	3	230	1	143
Manual of Weeds-Georgia	11	169	2	083	5	263	4	182	-	---	1	143
Weeds & How to Eradicate Them-Shaw	10	154	4	167	4	210	2	090	4	307	2	286
Soil Physics & Management-Lyons, Fippen and Buchan	20	308	8	333	6	316	6	273	-	---	3	429

	65		24		19		22		13		6	
	State		Gen. farm- ing section		Tobacco section		Trucking section		Dairying section		Fruit section	
	Total no. schools reporting yes.	% of schools report- ing yes.	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.	Total no. schools reporting yes.	% of schools reporting yes.
Farm Mgt., Economics & Cooperation												
Chap. in Rural Progress-Butterfield	8	123	1	042	5	263	2	090	2	154	-	---
Cooperation among Farmers-Coulter	5	077	2	083	5	263	-	---	1	077	-	---
Farmer's Business Handbook	14	215	4	167	5	263	5	227	3	230	-	---
Farm Managment-Warren	48	738	16	667	14	737	18	818	8	615	5	714
The Farm. & the New Day-Butterfield	12	185	3	123	2	105	7	318	3	230	-	---
Law for the Amer. Farmer-Green	17	169	6	250	17	368	4	182	2	154	2	286
Prin. of Rural Economics-Carver	19	292	5	208	10	526	4	182	3	230	1	143
Lab. of Farm Managment-Warren	16	246	4	167	6	315	6	273	2	154	2	286
Farm Managment-Adams	10	154	1	042	4	210	5	227	1	077	1	143
Effic. Market. for Agr.-Macklin	7	108	1	042	4	210	2	090	2	154	1	143
How Farmers Cooperate-Poe	8	123	2	083	1	052	5	227	1	077	-	---
Cooperation in Agr.-Powell General	10	154	2	083	4	210	4	182	1	077	-	---
Mat. & Met. in H. S. Agr.-Hummel	20	308	9	375	5	263	7	318	5	385	3	429
How to Teach Agr.-Storm & Davis	26	400	8	333	7	368	11	500	7	538	1	143
The Project Met. of Teach.-Stevenson	7	108	2	083	4	210	1	045	1	077	-	---
Vocational Education-Hill	5	066	2	083	3	158	-	---	-	---	1	143
Teaching Agr.-Nolan	10	154	3	123	3	158	4	182	3	230	1	143
App. Economic Botany-Lippincott	8	123	4	167	2	105	2	090	2	154	2	286
The Brown Mouse-Quick	7	108	2	083	4	210	1	045	2	154	1	143
Con. of Nat. Res. in the U.S.-VanRise	6	092	1	042	4	210	1	045	-	---	-	---
Handb. of Birds of E. Amer.-Chapman	8	123	2	083	6	315	-	---	1	077	-	---
How to Choose the Right Voc.-Merton	2	031	-	---	2	105	-	---	-	---	-	---
How to Know Wildflowers-Dana	10	154	1	042	7	368	2	090	1	077	-	---
Our Nat. Trees & How to Id. Them-Keel	12	185	3	123	7	368	2	090	1	077	1	143
Trade Foundations-Guy M. Jones Co.	-	---	-	---	-	---	-	---	-	---	-	---
The Young Man & His Voc.-Harris	1	154	1	042	-	---	-	---	-	---	-	---
Horticulture												
The Apple-Wilkinson	18	277	6	250	7	368	5	227	2	154	4	571
Farm Horticulture-Hood	28	431	9	375	19	473	10	455	5	385	4	571
Horticulture-Davis	29	600	15	625	13	591	11	500	8	615	5	714
Manual of Gardening-Bailey	21	323	9	375	5	263	8	364	4	307	2	286
Practical Gardening-Findley	10	154	4	167	4	210	2	090	2	154	2	286
Prod. Small Fruit Culture-Sears	22	338	4	167	8	421	10	455	2	154	-	---
Prod. Veg. Growing-Lloyd	37	569	10	416	9	473	18	818	7	538	3	429
The Pruning Manual-Bailey	24	369	8	333	10	526	6	273	2	154	4	571
Amer. Fruit Culturalist-Thomas	4	062	2	083	1	052	1	045	1	077	-	---
Productive Orchardng-Sears	37	569	12	500	11	579	14	636	8	615	4	571
Landscape Gardening-Waugh	9	138	4	167	3	158	2	090	3	230	-	---
New Creations in Plant Life-Harwood												
Journals												
Southern Planter	50	769	19	790	15	789	16	727	8	615	5	714
Country Gentleman	49	754	19	790	14	737	16	727	9	692	5	714
Progressive Farmer	41	631	11	458	15	789	15	682	5	385	2	286
Farm Mechanics	35	538	10	416	13	591	12	545	4	307	3	429
Breeders Gazette	24	369	14	580	5	263	16	842	6	460	2	286
Reliable Poultry Journal	13	200	4	167	6	315	3	158	1	077	2	286
Amer. Poultry Journal	7	108	4	167	1	052	2	090	2	154	1	143
Hoard's Dairyman	19	292	7	290	5	263	7	368	4	307	2	286
American Fruit Grower	10	154	5	208	3	158	2	105	3	230	3	429
Farm Journal	1	015	-	---	-	---	1	052	-	---	-	---
The Peanut Grower	2	031	-	---	1	042	1	052	-	---	-	---
Swine World	6	092	1	042	-	---	5	263	2	154	-	---
Farm & Fireside	4	062	3	123	1	052	-	---	1	077	1	143
Successful Farming	8	123	-	---	2	105	6	273	2	154	2	286
Everybodys Poultry Journal	7	108	2	083	-	---	5	227	1	077	-	---
Rural New Yorker	3	046	1	042	2	105	-	---	-	---	-	---